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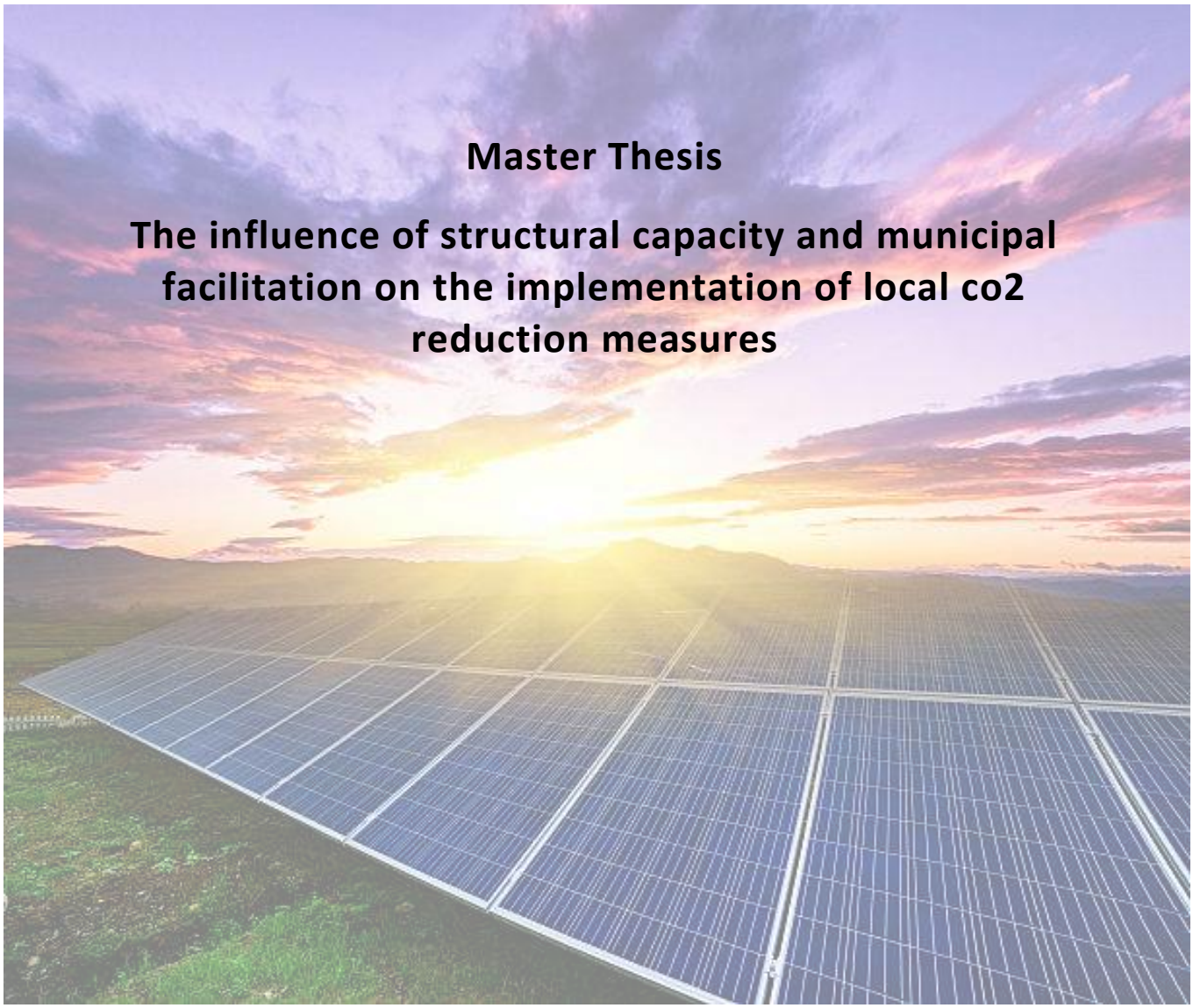

Master Thesis

The influence of structural capacity and municipal facilitation on the implementation of local co2 reduction measures

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Executive summary

In this day and age, bottom-up strategies and citizen initiatives are key to achieve sustainability goals. Especially in times where the government is taking a step back, there is a need for the self-organizing abilities of citizens to deal with social issues, such as the energy transition (Igalla & Van Meerkerk, 2015). Citizens are in need of reliable local green energy, and the local and national government is in need of this to achieve their future climate objectives. An important question is how these bottom-up initiatives focused on sustainability manage their organizational processes when implementing these co2 reduction measures and how their relationship with the government looks like (Elzenga & Schwencke, 2015). To gain more insight into factors that have an influence on the implementation of co2 reduction measures via local initiatives the following research question is composed; which factors are of influence on the implementation of bottom-up initiated co2 measures?

To achieve this goal, a conceptual model is created from various implementation, transition management, and governance theories. Three concepts were central in this study; structural capacity, municipal facilitation and municipal support rationale. In this exploratory research, five case studies have been explored through interviews and content analysis. The case studies are consisting of various Dutch bottom-up initiatives that have implemented co2 reduction measures via solar panels. There has been a specific focus on a combination of voluntary initiatives and professionalized initiatives, to see if there is a difference to be found here when it comes to the structural capacity and the collaboration with municipalities. Other than comparison in life cycle the cases are compared on overall grounds with each other.

This study concludes that when bottom-up initiatives have the following structural capacities; a shared understanding of co2 reduction, professional development, strong social networks and idealistic motivations, it will lead to the realization of co2 measures in the form of solar energy. For municipal facilitation, it is about creating awareness and offer funding through an inclusive, deliberative and effective manner. Moreover, for the municipal support rationale; increasing effectiveness of own policy and creating alignment by understanding what is going on in society are the key factors that influence the municipal support of bottom-up initiatives. As this study is exploratory, it has shown that many of the concepts are very broad and complex. Most of these concepts could be the focal point of several successive studies to get a better and more in-depth understanding of these factors.

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1. Introduction

Our society faces various persistent issues that are becoming more apparent by the day. These issues can be referred to as complex because they are deeply embedded in societal structures and systems, structurally uncertain, hard to manage because of actors that have different interests and behave unpredictably and hard to understand due to ill-structured processes (Rotmans & Loorbach, 2008; Klijn & Koppenjan, 2016). All of this makes it very difficult to predict complexity or to tame it through information gathering, exploration, and calculations (Klijn & Koppenjan, 2016). Complex problems are also referred to as wicked problems and include most of the policy issues (Rittel & Webber, 1973). One of the wicked problems we are facing today is climate change. Global Greenhouse Gas (GHG) emissions, and specifically CO2 emissions, associated with fossil fuel combustion have been rising since the early 1800s, but since 2000 this is happening at a faster pace (Mundaca et al., 2013). Even though the energy intensity of gross domestic product (GDP) is decreasing in general as well as the CO2 intensity of energy in most parts of the world, emissions have increased due to rapid growth in GDP and energy use, especially in Asia. If the course of global CO2 emissions is not reversed, temperature rises of 4°C or more from pre-industrial levels can be expected by 2100 (Fuss et al., 2014; Mundaca et al., 2013; Raupach et al., 2007). Global annual emissions will need to be reduced to ensure a chance of limiting this rise to 2°C. For this, a functioning international consensus has been created that is represented by the Paris Agreement (UNFCCC, 2015) (Bataille et al., 2016).

To be able to manage climate change and achieve the reduction of CO2 emissions, the restructuring of our societal system is needed (Rotmans & Loorbach, 2008). Complex problems need new and moderns ways of governance that promote complexity, interconnectedness, pluralism, and uncertainty needs to be managed and solved (Rittel & Webber, 1973). Literature refers mostly to network and interactive governance as a way to handle these problems (Rotmans & Loorbach, 2008). Governing climate change calls for the implementation of policies, programs and strategies on international, national, regional and local levels of society (Storbjörk, 2007, p. 457). Especially the local level is crucial as research shows that local authorities are key actors when it comes to coordinating and facilitating activities regarding climate mitigation (Storbjörk, 2007; Betsill & Bulkeley, 2007). A horizontal focus and the involvement of citizens in decision-making processes that impact their community are emphasized (Keast et al., 2007).

Citizens are expected to take responsibility for themselves and their environment, and they are assigned a new identity within democratic spaces, which involves being competent, autonomous and being able to take accountability for the provision of public services. This changing responsibility for citizens can be referred to as bottom-up civic initiatives (from now on bottom-up initiatives), in

which citizens can be considered as initiator or co-designer of public services (Voorberg et al., 2015). In this light, the question of implementation is intriguing, specifically in regard of drivers and barriers involved in the processes of bottom-up initiatives to reduce climate change on a local scale (Storbjörk, 2007; Betsill & Bulkeley, 2007). Most climate governance is based on top-down policies which are not complemented by bottom-up strategies, even though there are many examples that state that local action for decarbonization needs to be intensified (Tagliapietra & Zachman, 2016). Theory and practice show that these bottom-up strategies and citizen initiatives are essential to achieving sustainability goals. Citizens are more than ever taking action to manage local problems and needs and to improve their living environment. They do this in various organizational forms, such as cooperatives, project organizations or voluntary initiatives. Especially in times where the government is taking a step back, there is a need for the self-organizing abilities of citizens to deal with social issues, such as the energy transition (Igalla & Van Meerkerk, 2015). Not only the retreatment of the government but also the increasing need for locally generated energy plays a factor. Citizens are in need of reliable local green energy, and the local and national government is in need of this to achieve their future climate objectives. An important question is how these bottom-up initiatives focused on sustainability manage their organizational processes when implementing these co2 reduction measures and how their relationship with local government looks like (Elzenga & Schwencke, 201)

1.1 Research goal and research questions

As local action is critical to attaining international, national and local climate objectives, this research will focus on how co2 reduction measures can best be implemented on a local level and which factors have an impact on this from a social science perspective. The relevance of this study is to give a better insight into social innovation and governance issues. Five bottom-up initiatives will be looked into through case studies to find out which factors influence the implementation of their sustainability policies. The goal is to gain more insight into factors that influence the implementation of co2 reduction measures in local initiatives. Furthermore, the aim is to have a better understanding of best practices in this field and use this to advise on how policies can be best implemented within the context of local climate actions towards a low-carbon future. To achieve these goals the following research question is composed; *which factors are of influence on the implementation of bottom-up initiated co2 measures?*

A few sub-questions are formulated to answer the central question. The first one, with regards to policy implementation, defines the concept and explains the connection between public policy and the policy cycle. Because this research is about climate change the energy transition literature is taken into account.

• What does the literature say about the implementation of co2 reduction measures? (Chapter 2)

The second sub-question relates to the models of implementation with a bottom-up focus. Within these models, the variables that influence the policy implementation process will be elaborated on, and the implementation literature will be extended with newer theories such as network and interactive governance and transition management.

- Which factors influence the implementation of bottom-up initiated co2 reduction measures? (Chapter 2)

The third sub-question looks into the implementation factors and how they are expected to influence the execution of co2 reduction measures. A conceptual model is created that explains the presumed assumptions about top-down and bottom-up factors in the implementation process of bottom-up initiatives.

- How are the factors expected to influence the implementation of bottom-up initiated co2 reduction measures? (Chapter 3)

And finally, the last sub-question relates to the case studies that will be analyzed through interviews and document analysis. Important factors are identified, and advice is given on the crucial elements of the local implementation of co2 reduction measures.

- How do the factors influence the implementation of bottom-up co2 reduction measures when looking at the different cases? (Chapter 6)

1.2 Scientific and social relevance

The scientific relevance of this study can be explained in twofold. First, there is a lack of bottom-up strategies when it comes to the implementation of energy and climate policies. The primary focus is the top-down perspective, and this is not sufficient because the implementing of these policies are part of a complex process in which several actors are involved with different interests and perceptions. It is of importance that local action is also researched and incentivized so that local authorities and target groups are included in the process (Tagliapietra & Zachmann, 2016). Several studies have shown the importance of the involvement of local stakeholders on city level within low-carbon innovations (Tagliapietra & Zachmann, 2016; Corner et al., 2014; Riahi et al., 2017; Bulkeley

& Castan, 2013). Also outside the energy and climate literature, there is a focus on the inclusiveness of governance networks (Klijn & Koppenjan, 2016; Edelenbos & Van Meerkerk; 2016; Torfing et al., 2012). Even though this inclusiveness is very much emphasized there is little research when it comes to the implementation of energy and climate policies interactively and inclusively. This research will look into the factors that have an influence when it comes to bottom-up implementation of decarbonization policy. The findings will be used to advise local stakeholders on what the best practices are within this implementation process. Second, the policy implementation literature has been a bit dated. Scholars such as O'Toole (2000) and Hill and Hupe (2009) have tried to make a start with connecting policy implementation literature with governance and network governance theories. This research will build on this and connect bottom-up policy implementation models with network and interactive governance theory.

The social relevance of this research has to do with the understanding of the policy implementation literature connected to transition management theories and to understand how policy can best be implemented on a local scale when aiming to achieve a low carbon future. Theory and studies show a lot of fragmented bottom-up variables, but it is unclear which factors specifically influence the execution of local climate mitigation policy. Also, this study contributes to an understanding on how to assist and facilitate bottom-up policy implementation. Furthermore, by studying the decarbonization policy of several cases, this study adds to the empirical data on climate change policy.

1.3 Structure

The structure of this research is as follows. In the next chapter, the theoretical framework, the fundamental theories are explained. These theories regard policy implementation and transition management. In the third chapter, the theories and the most critical variables are operationalized. Chapter four described the methods of analysis. Chapter five gives contextual background information on the five cases and their co2 reduction measures and municipal policies. After this, chapter six presents the empirical findings and analysis of the interviews and document analysis. Finally, in chapter seven, the most significant results are summarized, and recommendations for further research are made.

2. Theoretical framework

2.1 Implementing new ideas through collaborations

Our society is becoming a complex network society in which a network and interactive approach are new ways of governing. Actors are creating formal and informal networks because of similar interests and objectives, and only joint action can help them achieve their goals. Governments start to work more on an interactive basis to activate those networks and stimulate them through targeted incentives. Also, other actors try to direct the network processes in which they have a mutual influence (Rotmans & Loorbach, 2008). This change refers to the shift from government to governance. Governance attempts to guide the complex processes of socio-technical change through deliberation, probing, experimenting and learning (Van den Bergh et al., 2011). The participation of non-state actors in decision making and execution is an essential aspect of governance, and a decentralized form of policy implementation is recommended (Newig & Fritsch, 2008; Papadopoulos & Warin, 2007). Literature shows that participatory governance contributes to the improvement of the quality of decisions through the inclusion of local knowledge and opens up the political agenda for environmental interests. This type of participation enables social learning, which helps to show win-win potential and it supports sustainable decision making. Also, the inclusion of actors seems to have a positive effect on the acceptance of decisions, which in its turn enhances compliance and implementation. The theory states that interactive forms of governance will lead to the more effective development of environmental quality (Newig & Fritsch, 2008).

Alongside network and interactive governance social innovation has become an essential part of societal management processes (Van der Have & Rubalcaba, 2016). The notion can be defined as the development and implementation of new ideas (products, services, and models) to meet social needs and create new social relationships or collaborations (Van der Have & Rubalcaba, 2016, p. 1925). The aim is to better cope with needs and problems than would be possible through the use of established methods (van der Have & Rubalcaba, 2016). There is also the need to develop interaction with others that have a different perspective on reality (Rotmans & Loorbach, 2008). Our society is becoming more complex, and citizens are required to be more involved in decision-making processes (Keast et al., 2007). Government is not the central actor anymore and governing is done outside and beyond the state with a focus on innovation. Governance in this context is the socially innovative institutional or quasi-institutional arrangements that are organized as horizontal associational networks of private, civil society and state actors (Swyngedouw, 2005). The rationality of governing is combined with new technologies, instruments and tactics for conducting the process of collective rule setting, implementation and policing (Swyngedouw, 2005, p. 1992). In the traditional model, state power is legitimized through the political voice of citizens, while the new

form of governance shows a different relation between power, citizenship and constitute (Swyngedouw, 2005). Schmitter defines governance as a mechanism for dealing with a broad range of conflicts in which actors regularly arrive at mutually satisfactory and binding decisions by negotiating with each other and cooperating in the implementation of these decisions (Schmitter, 2002, p. 52). The boundaries between organizations and public and private sectors have faded, and citizens are encouraged to have a more prominent role in the implementation of policy. This model implies a common purpose, mutual action, a framework of shared values, continuous interaction and the desire to achieve collective benefits that cannot be gained by acting independently (Schmitter, 2002).

Especially on a local level, these new arrangements of governance are unfolding in the form of innovative social movements and transformations in the methods of managing governance (Swyngedouw, 2005). Many cities around the world are experimenting with new types of governance that include collaboration, partnerships with civil and private actors, and the exchange of information and experiences (Khan, 2013; Betsill & Bulkeley, 2007). This impact of governance is caused by the decreasing control of local governments on the implementation of policy and the lack of authority to force actors to comply with policies (Betsill & Bulkeley, 2007). Municipalities need new ways of implementing policies because of the lack of full implementation capacity and the interdependence with other parties. As it is becoming more difficult for cities to enforce regulations, they try to implement policy through the use of 'governance through enabling.' This is when municipalities promote policy through soft measures such as information, economic incentives, guidance, and partnerships. Cities try to give the local economy co-benefits through policy measures (Khan, 2013). Effective policy implementation could depend on the creation of collaborative networks (Hjern et al., 1978). Governments try to foster policy networks and communities because they facilitate a consultative style of government, reduce policy conflict and make it possible to depoliticize issues, make policy-making predictable, and relate well to the departmental organization of government (Hill & Hupe, 2009, p. 68).

Not only the role of government is changing to a more facilitative style also the part of citizens is diverging. Citizens are expected to take responsibility for themselves and their environment. As noted in the introduction citizens are getting a new identity within democratic spaces (Voorberg et al., 2015). Societal actors are expected to take the initiative and develop ideas and projects on their own, which is not controlled by the government. Bottom-up initiatives have the potential for association, self-development, learning and local ownership, as is emphasized by developmental models of democracy and are expected to increase effectiveness and efficiency of the public service creation process (Edelenbos & Van Meerkerk, 2016). The network, social

innovation, and transition management theory shows interest in the role of citizens as agents of change and their ability to form niche spaces where new ideas and practices can be developed.

A central part of the management of energy transitions is the creation of network arrangements for collaboration and innovation (Hendriks, 2008). To be able to manage energy transitions successfully there is a need for the acceptance and support of citizens. Community energy projects are emerging and giving citizens the chance to engage actively in their community and local energy system. These projects involve energy productions, joint procurement, distribution, conservation or storage initiatives. These community projects rely on the involvement and participation of their members as volunteers and investors (Kalkbrenner & Roosen, 2015). Citizen participation can be defined as "a process in which individuals take part in decision making in the institutions, programs, and environments that affect them" (Kalkbrenner & Roosen, 2015, p. 61) Important factors for community energy projects are involvement, participation, and co-ownership and outcomes that are expected are energy savings and a climate-friendly energy system. Furthermore, it is likely that it promotes energy responsibility, raises awareness, fosters energy transitions, avoids opposition and implementation issues and offers a playing field for social innovations.

2.2 Green innovation

The transition management theory contains the main elements of the new forms of governance; network management, collaboration, and social innovation. It can be defined as "a multi-actor process with participation from government, societal and private organizations, knowledge institutes and intermediary organizations" (Rotmans & Loorbach, 2008, p. 14). It is a form of intelligent and long-term planning through small steps which are based on learning and experimenting (Rotmans & Loorbach, 2008). Transition management describes important governmental and social roles in advancing alternative pathways for a sustainable future (Kern & Howlett, 2009). Sustainability policies are very much focused on community action because of the need for active citizens and strong local democratic institutions, and these are expected to bear responsibility for sustainable development. Local sustainable measures generate a change in behavior on a social scale. Governments try to aim to increase social capital through micro- and meso level actions. Also in sustainable innovation policies, there is a trend in broader stakeholder participation, inclusion of citizens and local communities. To become more green as a society, there is a need for revolutionary developments in production and consumption systems, for which the reduction of carbon emissions is an example. These developments are unlike traditional improvements that only concentrate on single products of business practices. To be able to implement revolutionary developments, innovation and transition on the level of socio-technical

regimes is necessary (Seyfang & Smith, 2007). The socio-technical concept refers to systems that not only consists out of technological structures but also of social institutions and knowledge and that these aspects co-evolve. A transition in this system is a fundamental shift, where significant changes occur across domains, such as a technological, political, institutional, cultural, social sphere. A shift of this extent is necessary because current systems are locked-in to unsustainable courses set by dominating structures, instructions and practice which are referred to in the literature are regimes. A transition can thus be seen as a shift from one stabilized regime to another (Seyfang & Longhurst, 2016). The advancement of the socio-technical is a social and collective process and in the end, is driven by various social actors that manage innovation. To achieve the goals of sustainable development in current socio-technical regimes change needs to be coordinated between actors, institutions, and artifacts at various levels in and outside the regime. The regimes do undergo extreme changes, which mainly starts in a network of forward-thinking organizations, technologies, and users that are part of a niche practice (Seyfang & Smith, 2007).

Niches play an important part in transitions and are seen as promising, although small, forms of socio-technical radical green innovation (Seyfang & Longhurst, 2016). Niches are small-scale socio-technical arrangements in which different combinations of material elements, actors and rules are tested (Mattes et al., 2014). They can be defined as "a protected space where suboptimally performing experiments can develop away from regime selection pressures"(Seyfang & Haxeltine, 2012, p. 383). Change in the system occurs when the landscapes evolve and exert pressure on the regime and bottom-up alternatives at a niche level challenge the dominant socio-technical arrangement. This change occurs on an incremental level when the regime consolidates elements of the emerging niche without changing its primary belief system (Mattes et al., 2014; Seyfang & Haxeltine, 2012). Niches that concentrate on sustainability experiments are referred to as green niches, where there is a broad spectrum of participation and a focus on social learning. Green niches are in contrast to mainstream regimes in regards to systems of production and consumption (Seyfang & Smith, 2007). Seyfang and Smith (2007) extend and translate the conceptual model of green niches to the grassroots innovations literature, with sensitivity to the differences between the two concepts. The literature on green niches does not have a specific focus on grassroots innovations, but several studies have included the concept (Kemp et al., 1998; Hoogma et al., 2005; Seyfang & Longhurst, 2016; Seyfang & Haxeltine, 2012).

Grassroots innovations are not exclusive sources for a sustainable future, but a source of innovative diversity and can be defined as innovative networks of activists and organizations that lead bottom-up solutions for sustainable development; solutions that respond to the local situation and the interests and values of the communities involved. In contrast to the greening of mainstream

business, grassroots innovations tend to operate in civil society arenas and involve committed activists who experiment with social innovations as well as using greener technologies and techniques (Seyfang & Smith, 2007, p. 585). Sustainable innovation traditionally copes with niches with the market economy. Sustainable innovation does not have to deal with the full extent of market competition, niches are spaces with different rules, and conventionally these rules correspond with those of the market. Grassroots innovations oppositely exist amidst the social economy of community actions and social enterprises. An important connection to the niche perspective is that grassroots innovations also focus on differing social, ethical and cultural rules. Grassroots innovations rely on resources, such as grant funding, limited commercial activity, voluntary input and mutual exchanges, where conventional market-based niches are focused on profit. The primary driver of grassroots innovations is meeting social needs. Social economy can provide flexible and local services in places where the market cannot (e.g., local organic food or community renewable energy). An ideological commitment to alternative ways of doing things is another important goal. These ideologies go against the hegemony of regimes (Seyfang & Smith, 2007).

According to the niche theory, grassroots innovations have two types of potential benefits. First, the intrinsic benefits are connected to the social and environmental foundation of the niche. Small-scale projects might be seen as irrelevant when looking at their impact, but if broader policies lead to a more substantial number of them, the impact could be significant. Grassroots innovations can also have an essential impact on socio-economic scale, for example, the creation of new jobs, development of skills and personal growth, having a sense of community, creating social capital, improving access to services, improving health and higher civic engagement. Grassroots initiatives can be seen as groups attempting to improve the quality of life in their local communities. Grassroots innovations can create benefits for sustainability where top-down measures have difficulties. Local groups have knowledge and experience on what works and what matters in their local context. Also, grassroots can be a place where the action is taken on unpopular issues, which are not taken up by mainstream actors. Second, the diffusion benefits are based on varying values from the mainstream. This is about the bottom-up creation of alternative systems of provision. Grassroots actors try to mobilize communities to develop these systems. These innovations have the potential to produce changes in production-consumption systems in a manner individuals cannot. Niches can also be used to reflect critically on mainstream reforms. Finally, in niche terms, grassroots innovations show first- and second order learning (ibid).

Aside from the benefits, grassroots innovations face various challenges on intrinsic and diffusion level. The intrinsic challenges refer to internal issues on how the grassroots innovations are

managed, the required skills and resources and their vulnerability to setbacks, such as cuts in funding, losing principal actors or changing policy priorities. The second categorization is diffusion challenges, which are the barriers that could diminish the broader, external influences that grassroots innovations might have. This can be context-specificity and 'geographical rootedness,' ideological commitments to be different compared to the mainstream, competition from more powerful mainstream groups who might develop alternatives and the risk aversion of policymakers when dealing with small-scale, often radical, and relatively informal innovating organizations. Both the intrinsic and diffusion challenges relate to the struggle to keep a sustainable socio-technical space in a larger unstainable regime (Seyfang & Smith, 2007; Seyfang & Haxeltine, 2012). The next part of this chapter will dive into the factors that influence the organization and management of green niches (grassroots innovations).

2.3 Implementing bottom-up solutions for sustainable development

When looking at the general policy implementation literature, implementation falls under the notion of public policy. Public policy can be seen as a set of interrelated decisions taken by a political actor or group of actors concerning the selection of goals and the means of achieving them within a specified situation where those decisions should, in principle, be within the power of those actors to achieve (Howlett et al., 2009, p. 6). A manner to simplify public policy is to think of it as a process. In this process, a series of stages are identified in which policy issues and deliberation flow from inputs to outputs. These sequence of stages is referred to as the policy cycle. This cycle exists out of five stages; agenda setting, policy formulation, decision-making, policy implementation, and policy evaluation (Howlett et al., 2009). As this research will look at factors that are of influence on the implementation of activities of bottom-up initiatives the implementation stage will be elaborated.

After a public problem has reached the policy agenda, different solutions have been proposed, policy goals are set, and a course of actions has been decided a decision needs to be put into practice. Putting policy decisions into action is part of the implementation stage of the policy cycle. The concept can be explained according to the definition of Ferman (1990): "Policy implementation is what develops between the establishment of an apparent intention on the part of government to do something, or to stop doing something, and the ultimate impact of the world of action" (DeLeon & DeLeon, 2002, p. 474). As noted in modern times participation and initiatives of citizens also need to be included (Kalkbrenner & Roosen, 2015). In this context citizen participation refers to members of society who serve without getting paid and do not have formal governmental decision-making authority in the formulation and implementation of public policy. However, direct citizen participation and bottom-up initiatives do require the collaboration between citizens and public officials. Citizens are seen as an integral part of governance processes, and their active

involvement is crucial in decision-making that concerns the social community (Roberts, 2004). The direct participation of the citizens in public policy processes concerning their community can be defined as follows: “a process in which individuals take part in decision making in the institutions, programs, and environments that affect them” (Heller et al., 1984, p. 339).

Within the traditional policy implementation literature, there is a debate between top-down and bottom-up models. Both models try to identify components of a complex process that is occurring across time and space and involving multiple actors. Scholars on implementation vary in the way they respond to this complexity (Hill & Hupe, 2009). The top-down theories focus on institutional and commitment-oriented hypotheses that assume a command and control direction. And bottom-up scholars such as Michael Lipsky (1971 and 1980) and Benny Hjern (1982; Hjern & Hull, 1983) state that street-level bureaucrats and other social actors are crucial for successful implementation and that this should be the starting point. Bulkeley & Betsill (2003) and Storbjörk (2007) emphasize that the implementation of climate protection is not a technical issue but a political one, where various actors and groups try to understand the problem, the solutions and take action. Especially the bottom-up perspective has common ground with citizen participation and initiation.

Bottom-up theorists argue that in the policy implementation process various actors have to be included. Implementation only works when from the beginning of the process also other social actors such as social bureaucrats, private firms, and target groups are involved in the planning and execution of the programs (DeLeon & DeLeon, 2002). Strategic initiatives could come from various parts of society, such as private sector, street-level bureaucrats, local implementing officials and other policy subsystems. The bottom-up approach is most useful in situations where dominant policy legislation or agency is missing, and there is a multitude of governmental and non-governmental actors with no leading participant (Sabatier, 1986). Another argument made for this method is to include street-level bureaucrats and target groups because they can deploy strategies to change policy to their own needs and wishes (ibid). According to Hjern et al. (1978), the bottom-up method identifies a network of actors that are involved in service delivery and looks into the goals, strategies, activities, contacts and strategic interactions of these actors. This method concentrates on the local level of policy implementation (Sabatier, 1986).

As noted earlier the role of citizens has changed within governance and especially within the energy transition context. Bottom-up initiated co2 reduction measures can be an essential means for energy transition on a local level (Kalkbrenner & Roosen, 2016). Citizens are becoming more outspoken, and if they do not agree with the delivery of public services or are of the opinion that they can do it better themselves, they will initiate own initiatives (Gofen, 2015; Edelenbos & Van

Meerkerk, 2016). Citizens are not anymore seen as recipients of services and do not have a passive or reactive role anymore. Social actors are taking a more proactive role as a co-producer or even as entrepreneurs (Gofen, 2015). Various research has been done on bottom-up initiatives in the energy transition field (grassroots innovations) and the studies show different factors that influence the management of these initiatives (Seyfang and Smith, 2007; Kalkbrenner & Roosen, 2016; Loorbach, 2007).

According to theorists (O'Toole, 2000; Hill & Hupe, 2009), network governance and network management theory are very much connected to participatory and interactive governance, and it is a way to broaden the horizontal dimension of policy implementation. Network theory goes more into depth in the complexity of public issues and how interactions between involved actors are key to deal with complexities (Klijn & Koppenjan, 2016; Torfing, 2012; Scharpf, 1978; Rhodes, 1996; Osborne, 2006). Scharpf (1978) is an important scholar for the introduction of the network ideas into the policy implementation study. He emphasized the following: "It is unlikely, if not impossible, that public policy of any significance could result from the choice process of any single unified actor. Policy formulation and policy implementation are inevitably the results of interactions among a plurality of separate actors with separate interest, goals, and strategies (p. 347). In his paper he gives collaboration and coordination a central role in the implementation process, which introduces the next paragraph of the theoretical focus of this research where network theory is implemented as an extending theory for the bottom-up method.

In the energy transition literature, several management styles are connected to network governance and complexity theory (Kemp et al., 1998; Loorbach, 2007; 2010). An example is the concept of transition management as Loorbach (2007, 2010) has explained in his studies. According to him abstract governance principles, such as a focus on social learning, participation, and interaction among stakeholders and steering from the inside, need to be translated into a practical management framework for energy transitions. This framework can be referred to as an analytical lens to evaluate how social actors deal with complex social problems at various levels and also try to influence governance processes. Four types of governance activities are determined which apply to societal transitions: strategic, tactical, operational and reflexive. As this framework of Loorbach is very interesting in the case of energy transitions, it does not have a local focus and mainly looks at the overall process of social transitions and involved actors from various levels. Another framework that does have this local focus and looks at niches from an internal social process perspective is that of strategic niche management (Geels & Kemp, 2000). Strategic niche management centers on factors that support successful niche development (Kemp et al., 1998; Seyfang & Longhurst, 2016). This type of management tries to create protected spaces where new technologies can be applied. It

tries to bring together knowledge and experience of involved actors in the technology development process and creates interactive learning processes and institutional adaptation, especially learning is essential in strategic niche management (Kemp, 1998). Next to the development of niches of new technologies this models also applies to niches for new practices and arrangements, such as product sharing and green electricity packages (Geels & Kemp, 2000).

Critical factors according to the strategic niche management framework are managing expectations, building social networks and learning. Expectation management regards the way niches present themselves to external parties and if they can live up to promises made about performance and effectiveness. These expectations should be broadly shared, specific, realistic, and achievable. Networking activities are supporting the niche when they include various stakeholders, who can use their resources to support the growth of the niche. And finally, learning processes are most effective when they contribute to common knowledge but also to second-order learning in which actors question the assumptions and constraints of the regime systems (ibid). Loorbach (2007) mentions six central elements of policy making and governance as an essential part of transition management. Even though the transition model framework does not have a specific local focus, several elements of his study do have similarities with the key concept of strategic niche management and can be used to give a more elaborate explanation. Aside to these aspects Van Der School and Scholtens (2014) add relations with outside networks, which relates to contact with outside parties, such as local and national government and private organizations. Also, according to these theorists, the degree of commitment of local actors to the project is an important factor. In this case organizational development, a shared vision and the level of activities influence the success of bottom-up initiatives.

Even though bottom-up implementation factors are crucial for niche management, the development of collaborative and network forms of governance are often subject to push and pull processes that take place between citizens and government (Edelenbos & Van Meerkerk, 2016). The behavior of top-level actors influences the implementation of policies and the delivery of services. Bottom-up models have too much focus on local autonomy and overlook the fact central policy designers also have a certain control in the implementation process (Matland, 1995; Winter, 1990). Furthermore, networks and bottom-up initiatives are seen as having a negative impact on democracy. It is becoming more difficult for top-level actors to influence decision-making. Also, actors that are already strong negotiators and networkers have a significant advantage over less empowered actors (Sørensen, 2006). Kemp (1998) argues that even though governments do not lead the process of niche management, they should take on the role of enabler or facilitator to make sure that the projects keep developing and that satisfactory results are achieved. Facilitating

activities for the government could be monitoring, evaluation of outcomes and policies, and in case of unwanted results applying force to correct the outcomes. For local governments, network management activities would work best in the case of niche management. These notes show that top-down factors should not be disregarded and that an ideal research strategy is to combine both the bottom-up and top-down models of policy implementation (Winter,1990).

2.4 Facilitating bottom-up initiatives

According to top-down models, policy designers are the central actors and focus their attention on components that can be controlled on the central level (Matland, 1995). This approach has attention for formally involved actors in the implementation process of a program. These actors are thus defined formally and programmatically. Within this perspective, the analysis starts at the top and does not always reach delivery-level actors (Palumbo & Calista, 1990). Top downers want to make policy advice as generalizable as possible (Matland, 1995) and show how to structure the implementation process from above to achieve the purpose of the legislation and to minimize the number of decision points that could be vetoed (Winter, 2003, p. 213). Common advice is to make policy goals clear and consistent, minimize the number of actors, limit the extent of change necessary and place implementation responsibility in an agency sympathetic with the policy goals (Matland, 1995, p. 147).

When looking at newer governance theories, the roles of authoritative actors have changed. Especially with an increase in the self-organizing citizens, politicians and public servants need to take on a more facilitative and enabling role (Khan, 2013; Kemp, 1998). Storbjörk executed research on local climate adaptation in Sweden, and her findings showed that within this context there is some ambiguity on responsibility and authority. Actors seem to generally rely on others to legitimize decisions and proposing action for climate adaptation. Local actors show the need for authoritative initiatives from above (Storbjörk, 2007). The wait and see mentality within local actors also shows in other studies regarding climate mitigation (Naess et al., 2005; Allman et al., 2004). The study of Allman (2004) shows that the lack of commitment and support from local key actors, lack of funding, and lack of appropriate guidance from the government are seen as obstacles to action. Also, Seyfang and Longhurst (2016) stress the importance of external networks in niche management where networking activities are occurring with the government. This stresses the importance of facilitative guidance from local authorities (municipalities) in climate policy.

Sorensen (2006) also stresses the changing role of authorities in the process of democratic governance. She argues that governance should be managed through various forms of meta-governance. “Metagovernance is a way of enhancing coordinated governance in a fragmented political system based on a high degree of autonomy for a plurality of self-governing networks and

institutions" (p.100). Metagovernance can be performed through hands off or hands on coordination styles (Sorensen, 2006). As noted earlier authorities should take on a facilitative and enabling role, which fits the meta-governance form of hands-on support and facilitation. Herein municipalities offer support and facilitation to bottom-up initiatives. A meta-governer communicates directly with actors involved in the initiatives in a supportive and facilitative manner. This is a nonassertive strategy, in which the meta-governer is a neutral party and does not want to achieve his or her own goals. The meta-governer aims to support and promote actions performed by bottom-up initiatives (Sorensen, 2006). Korosec and Berman (2006) elaborate several ways in which local authorities (municipalities) can support and facilitate local initiatives. Municipal managers can support bottom-up initiatives by creating awareness on the issue of co2 reduction in the community. Also, municipalities can assist bottom-up initiatives through the acquisition of resources by joining in the submission of grants and funding proposals and promise to match funds from a private origin. Finally, Coordination is essential for the development of bottom-up initiatives and municipalities have much expertise in the management of networks (Korosec & Berman, 2006).

Local initiatives are addressing social issues in their communities when doing so municipal support is important for the future of these initiatives as it can boost their development (Duijn et al., n.d.). Especially because government funding for social problems has been reduced, due to economic difficulties, which makes the need for local funding sources more essential (Korosec & Berman, 2006). The involvement and participation of citizens are needed to implement environmental policies, because of the decentralization of the energy system and energy self-sufficiency (Kalkbrenner & Roosen, 2015). There are various reasons why municipalities would support bottom-up co2 reduction initiatives. Through the inclusion of citizens in the implementation process of co2 reduction measures increase effectiveness and integration, which could overcome the fragmentation problem. Also by acknowledging interdependencies municipalities can join forces and have access to more knowledge, leadership, and resources (Edelenbos & Van Meerkerk, 2016; Korosec & Berman, 2006). It is often thought that these initiatives create a certain amount of innovation, experimentation and are cost-effective (Korosec & Berman, 2006). Furthermore, through the organization of collaborative governance, citizens become more aligned with municipalities and get a better understanding of their policies. This also works the other way around where local authorities get to know important issues in society and what they should include in their policies and plans (Edelenbos & Van Meerkerk, 2016). Finally, bottom-up initiatives allow public leaders to focus on other issues for which there are no social initiatives yet to manage it (Korosec & Berman, 2006).

3. Research design

3.1 Successful implementation

In the policy literature, some authors tried to synthesize the top-down and bottom-up theory and develop a combined model (Mazmanian & Sabatier, 1986; Goggin et al., 1990; Matland, 1995). A combination of both models is the ideal way to analyze implementation processes. Figure 1 represents a conceptualization of the described theories and tries to integrate implementation and transition management literature from a governance perspective. The model shows three overarching factors that, according to studies, have an influence on the implementation of bottom-up initiated co2 reduction measures: the structural capacity, hands-on municipal facilitation, and support rationale. It shows the relation between the dependent and independent variables. Especially noteworthy is the relation between the organizational capacity (independent) and implementation (dependent). However as argued earlier, other factors also influence this.

As noted policy implementation can be seen as something that develops between the establishment of an intention and the final impact of the world of action. In this case, the intention is to implement solar panels on a local scale to contribute to the reduction of co2 emissions (DeLeon & DeLeon, 2002, p. 474). Matland (1995) adds to this that policy implementation can occur on two levels; the macro implementation and the micro implementation level. At macro level centrally located actors create a governmental program and at micro level local actors react to these plans by developing their programs and implementing these. The focus of this research is on the development of the process on the micro level of the implementation of bottom-up co2 reduction plans and to see which of the theoretical factors are most relevant. It is also essential to have an insight on what success factors are for implementation. Successful implementation can have different meanings. For top-downers it is a specific outcome which directly relates to statues. Bottom-up theorists look at evaluation from a broader standpoint, where a program that leads to positive effects can be seen as successful. A standard to use for successful implementation is loyalty to prescribed goals. If there are no specific goals, more general social norms and values will be taken into account (Matland, 1995). These goals can have various forms for social initiatives according to Evers (2001): social goals are about benefiting the community, economic goals have to do with the fact that initiatives have an entrepreneurial nature and political goals are connected to socio-political action.

The term positive effects is quite vague, according to Walker et al. (2009) cooperation, cohesiveness and trust are characteristics of local renewable energy initiatives, but also outcomes of local level activities which will have future benefits. Especially trust is an important characteristic and outcome of cooperative behavior. Putnam argues that (1993) trust is fundamental to civic

engagement: 'trust lubricates cooperation and cooperation builds trust' (ibid p. 171). Other studies also see trust as a significant factor in building mutual respect and reciprocity (Walker, 2009; Newton, 2001). Theorists such as de Tocqueville and Mill argue that trust has its origins in that broad, deep, and dense network of voluntary associations and intermediary organizations that comprise civil society. Trust is defined as the actor's belief that, at worst, others will not knowingly or willingly do him harm, and at best, that they will act in his interests (Newton, p. 202). Trust makes it possible to keep up calm and lasting social relations which are the basis for collective action and productive cooperation (Newton, 2001).

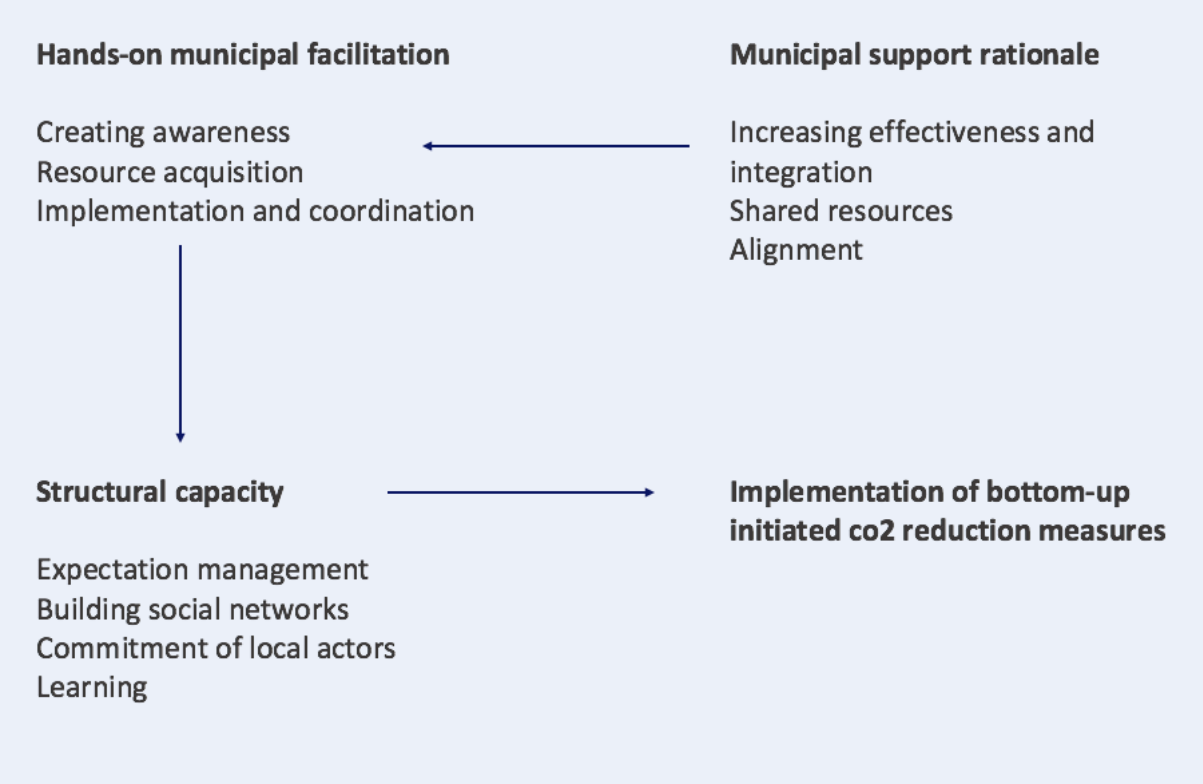

Figure 1: conceptual model

3.2 Structural capacity

As shortly mentioned, the main factors of strategic niche management are: managing expectations, building social networks, the commitment of members, and learning. Within the governance literature, this corresponds with the organizational capacity theory, which is about the ability of an organization to gather and deploy the capital needed to fulfill its mission or mandate (Sharpe, 2005, p. 387). Organizations have different ways to get capital. Sharpe (2005) has made a description of the organizational capacity of bottom-up initiatives (grassroots) and argues that their process exists out of financial, human and structural capacity. As the factors of niche management correspond with the structural capacity aspects, these will be taken into account in this study. Structural

capacity exists out of three main elements: planning and development capacity; infrastructure and process capacity; and, relationship and network capacity (Hall et al., 2003, p. 37). When it comes to bottom-up initiatives planning and development capacity and relationship and network capacity matter most (Sharpe, 2005). As planning and development capacity has to do with the development of strategic plans and the creation of a mission statement or future vision, managing expectations can be included in this. Also, learning is an organizational aspect that has to do with planning and development, in order to develop shared values and knowledge based on past experiences (Bess et al., 2011). Building social networks and the commitment of members matches with the relationship and network capacity, where building internal and external relationships are a focal point (Hall et al., 2003).

Managing expectations, promises of new technologies are an essential aspect of niche development. These promises are most effective when they are shared, credible (supported by facts and tests), specific (with respect to technological, economic and social aspects), and coupled to certain societal problems which the existing technology is generally not expected to be able to solve (Kemp et al., p. 189). Expectations are managed through envisioning, scenario- and trends analyses, back- and forecasting exercises, and identification (and selection) of innovations (Loorbach, 2007, p. 90). Important is to create a shared vision towards the future, which is inspiring, imaginative, and participatory. It should be a representation of a shared definition of sustainability within a social system (Loorbach, 2007). In governance terms shared, credible, and specific promises are referred to as joint image building, which is achieved when actors have a better understanding of the problem and the outcomes of particular solutions. This better understanding comes forth out of interaction and research and the actors agreement on perceptions and authoritativeness of available knowledge. Consensus on solutions between actors needs to be based on perceptions that are founded on (scientific) knowledge (Klijn & Koppenjan, 2016). An inspiring and shared future vision as an organization is a form of transformational leadership, where followers are inspired to achieve exceptional outcomes (Bass & Riggio, 2006). Transformational leaders help followers grow and develop into leaders by responding to individual followers' needs by empowering them and by aligning the objectives and goals of the individual followers, the leader, the group, and the larger organization (ibid, p. 3). This all has a positive effect on follower satisfaction and commitment. Learning is essential when it comes to bottom-up initiatives, especially about the needs, problems, and possibilities. Both first- and second-order learning are important in this case. First-order learning refers to the contribution to common knowledge and expertise, and second-order learning refers to questioning the assumptions and constraints of regime systems (Kemp et al., 1998). Loorbach (2007) argues that in a network it is essential to reflect on changes in beliefs, perceptions, and solution

strategies and see if convergence in these has been achieved (p. 152). Learning in a network means the increase in knowledge, insights and work methods shared by involved actors (Klijn & Koppenjan, 2016). Learning on a network level can also be referred to as social learning (Loorbach, 2007). In this case, there is a reflection on values, strategies, assumptions, and policies that drive activities and these are changed through learning and if there are joint outcomes and co-production of policies and services (Loorbach, 2007; Provan & Milward, 2001).

Building a social network is important for bottom-up initiatives so they can expand by involving new actors in the participation process, this might cause the need for a change of activities and interactions among existing actors. Actors in a network have interdependencies they have to acknowledge by sharing their resources, which can be in the form of finances, knowledge of skills (Scharpf, 1978; Bevir, 2009). The network needs to be inclusive and fair to all stakeholders, to do this correctly. It is vital that third parties, who are not directly involved in the network, are still able to contribute to ideas (Kemp, 1998). This is also emphasized in the network governance literature: the process needs to be open and involve third parties and their interests. Also, there should be a good deliberation process, in which fair and clear agreements are made between actors while sharing knowledge and exploring solutions. Building a social network refers to the internal network and external network of bottom-up initiatives (Klijn & Koppenjan, 2016). And the degree of commitment of local actors to the project relates to organizational development, a shared vision, and the level of activities. Organizational development is the evolving of a bottom-up initiative from an ad-hoc working group to a more formal organizational type. For this development, the sustainability of participation is important, which can be measured through the continuity of members, the number of active members and the number of time members are willing to put in activities. Also guaranteed team leadership and trust in the network is an essential factor when it comes to having committed actors in the network (Van Der Schoor & Scholtens, 2014). Intrinsic motivation drives members, and this can be stimulated by an enabling management style that is aimed at creating strong relationships and trust. Actors need to be given responsibility and freedom (Klijn & Koppenjan, 2016). A shared vision is very closely related to joint image building within the management of expectations. Finally, the level of activities is seen as an indicator for a high commitment of involved actors. This indicator is about the spectrum of activities bottom-up initiatives initiate, such as education, informative, funding and social media activities (Van Der Schoor & Scholtens, 2014).

3.3 Municipal facilitation and support rationale

According to the theory, enabling and facilitative leadership from municipalities is essential, the hands-on meta-governance form of support and facilitation has the most similarities with this. In this case, there is direct contact between municipal actors with bottom-up initiative members (Sorensen,

2006). The definition of hands-on meta-governance is still quite abstract. Korosec and Berman (2006) elaborate this theory with specific ways in which municipalities can facilitate bottom-up initiatives and the rationale that lies behind this. Municipal managers can support bottom-up initiatives by creating awareness, assisting in acquiring resources and assisting in coordination and implementation. To create awareness, municipalities can speak out on the subject of co2 reduction and take part in events, which provides legitimacy and interest in the actions of these initiatives. They can also request elected officials to give attention to the matter during public meetings. Municipal authorities can educate starting initiatives in planning, program, and resource development strategies (Korosec & Berman, 2006). Furthermore, municipalities can assist bottom-up initiatives through the acquisition of resources by joining in the submission of grants and funding proposals and promise to match funds from a private origin. Another way to support is to provide cash or in-kind means. Also, municipal managers can give referrals and access to other parties who can assist initiatives in obtaining resources (Korosec & Berman, 2006; Duijn et al., n.d). Finally, coordination and implementation are important for the development of bottom-up initiatives and municipalities have much expertise in the management of networks. Municipalities can make sure organizations work together effectively and share knowledge and information. Also, they can help in ways that make implementation of measures easier by expediting permitting or approval for a project. Also, they can support and lead the development of networks (Korosec & Berman, 2006).

The rationale behind this support could vary. It could be expected that bottom-up initiatives increase effectiveness and integration on cost level and innovation level. Also by acknowledging interdependencies, municipalities can join forces and have access to shared resources, such as knowledge, leadership, skills (Edelenbos & Van Meerkerk, 2016; Korosec & Berman, 2006). Another factor could be alignment, through collaborative governance, citizens get to know and become more aligned with municipalities and their policies. This also works for local authorities as they will get a better understanding of what is going on in society and what issues are essential for them to focus on (Edelenbos & Van Meerkerk, 2016).

3.3 Operational model

Table 1 gives an overview of all the above-elaborated concepts. Every concept has been specified through a variable and the variable through an indicator. The goal of this model is to make the concepts measurable and specific. This is done by observing and analyzing the theory carefully (Neuman, 2013). With this operational model, the interview questions and codes are created, this will be further elaborated in the methodological chapter.

Concept	Variable	Indicator
Implementation of bottom-up co2 reduction measures	Micro-level	Development of own plans and implementing these
		Implementation is successful when local goals are achieved or at least have a positive effect on the local community in the form of social trust
Structural capacity of bottom-up initiative	Planning and development capacity: expectation management	Shared future vision based on a shared definition of sustainability
		Joint image building through interaction and authoritative (scientific) research
	Relationship and network capacity: building social networks	Inclusive and deliberative process while sharing knowledge and exploring solutions
	Relationship and network capacity: commitment of local actors	Development of bottom-up initiative from ad-hoc to more formal through activities of members
		Members are driven by intrinsic motivations and are given responsibility and freedom
	Planning and development capacity: learning	Social learning through reflection on perception, strategies, and solutions
Hands-on municipal facilitation	Creating awareness	Give or ask for attention on co2 reduction measures
	Assistance in resource acquisition	Facilitating in the submission of grants and funding or providing cash or in-kind means
	Assistance in coordination and implementation	Facilitating by making sure organizations work together in an effective manner and share knowledge
		Facilitating by expediting permits or approval for projects
Municipal support rationale	Increasing effectiveness and integration	The expectation that bottom-up initiatives increase effectiveness and integration
	Access to shared resources	Join forces and have access to shared resources, such as knowledge, leadership, and skills
	Alignment	Municipalities understanding what is going on in society
		Citizens get more aligned with municipal policies

Table 1: operational model

4. Methodology

4.1 Case selection

This paper is explanatory in the form of multiple case study research. Case study research is a conventional method in social science to have a better understanding of complex social phenomena (Yin, 2014). The research question, theoretical concepts, and relationships are quite complex, which makes it hard to research this via a quantitative study. Case study research gives in-depth and varied information (Neuman, 2013). It examines the details of a case's internal features, which is taken into account in this research as the structural capacity and it looks at the surrounding situation, in this case, the relationship with the municipality (ibid). According to Walton (1992) "the logic of the case study is to demonstrate a causal argument about how general social forces shape and produce results in particular settings (p. 122)".

The case studies are consisting of various bottom-up initiatives that have implemented co2 reduction measures via solar panels. There are various mitigation forms on which bottom-up initiatives can focus: for example wind, solar, and energy neutral communities. For this study, there is chosen for the implementation of solar panels, as this is a method that is more simple and clear than for example wind energy. Wind energy is less tangible for citizens, it needs substantial investments, and it has an enormous impact on the surroundings. Research shows that solar energy is seen as the best alternative according to the Dutch citizens. This method is easier to implement on a small scale and citizens can lead these projects themselves (Van der Werf et al., 2015). Furthermore, the Dutch government wants to be gas free in the future and tries to stimulate sustainable energy through grants, such as the SDE arrangement (stimulering duurzame energie) (RVO, n.d.).

4.2 Methods

As this study is about measuring theoretical concepts in social life with data gathering, qualitative methods are used in the form of interviews and content analysis. In quantitative research measurement only occurs before data gathering. For the measurement and the coding of the concepts, an operationalization has been made. This operationalization is based on theoretical concepts. The full operationalization scheme including interview questions can be found in the appendix. The research questions have been prepared upfront to make sure the right concepts were measured. However, it was possible to deviate from this during the interviews when questions were already answered or when other important information came to light.

The primary method in this research is case studies. As the concepts in this research are complex, multi-factor and quite abstract, this method helps to identify the concepts and extend

them. Case studies can make the details of social processes, in this case of cooperative implementing co-2 reduction measure, visible and show relations. This type of research also gives the opportunity to show multiple perspectives of the study matter (Neuman, 2013). Furthermore, the content analysis is an unobtrusive measure and used to analyze online documentation, such as websites, business plans, newsletters, and statutes of the bottom-up initiatives. This type of analysis is executed next to the case studies to see if interviewees give answers that are in accordance with other external communication through documents. Also, to have a more in-depth and precise picture of the concepts that are central in this study (Babbie, 2013; Neuman, 2013). Finally, the theoretical concepts have been defined and specified in an operational framework to make it measurable and the study repeatable. For the case studies and the content analysis, this framework has been used.

4.3 Sample

The sample in this research consists out of five cases. The cases have been randomly selected by using the online database of Hieropgewekt, which is an online sustainability platform. Various cases (that implement solar energy projects) in Dutch cities have been selected and contacted. A total of 30 organizations have been approached for this study. Five organizations reacted to this and were willing to participate, and thus appointments were made for interviews. In the appendix, a total list of all approached organizations can be found. Besides solar energy focus, Dutch organizations, and a variation in organizational form, there is not made use of strict selection criteria. This has to do with the time of this study and the slow reactions and in many cases unwillingness to cooperate.

The organizations in the cases exist both out of bottom-up citizen initiatives and more professionalized cooperatives. There has been a specific focus on a combination of voluntary initiatives and professionalized initiatives, to see if there is a difference to be found here when it comes to the structural capacity and the collaboration with municipalities. Bottom-up initiatives can take on various organizational forms: a cooperative, an association or as a private firm. A cooperative is a form in which people can realize their goals in a democratic manner, which also offers more support. With a cooperative, the members are the ones that decide on the course of the organization. And the cooperative works as an organization. With a foundation, societal goals are the focal point, and with a private company, it is about economic results. The organization forms are usually included in the statutes of the organization (Hoefsloot, 2015). Cooperatives that focus on project execution can be referred to as project cooperatives; they are initiative takers and project planners. It could also be the case that for every project a new project cooperative is established, the parent company is still one of, or the only shareholder but does not own the energy installation anymore (Elzenga & Schwecke, 2015).

Other than comparison in life cycle the cases are compared on overall grounds with each other. Three of the initiatives are based in Amsterdam. Zuiderlicht and Ecostroom are project cooperatives that focus on the implementation of solar projects, Buurtcoöperatie Oostelijk Havengebied is a cooperative and has a broad focus among which is sustainability and solar energy. One of the initiatives is based in Amersfoort: Duurzaam Soesterkwartier is an association that is focused on the sustainability of their neighborhood. The last case is based in Best. Best Duurzaam is a cooperative, even though they operate more as an association and they are mainly focused on creating awareness on sustainability within their community. Furthermore, interviews have been conducted with council members and public servants from the Amsterdam, Amersfoort, and Best municipality. Table 2 gives an overview of the cases and people that have been interviewed. Functions are mentioned instead of names for privacy reasons.

Municipality	**Cooperative**	**Function**
Amsterdam	Zuiderlicht	Executive employee (Zuiderlicht)
		Senior policy officer (municipality)
	Ecostroom	Board member (Ecostroom)
		Project leader (Ecostroom)
		Public servant in sustainability department (municipality)
	Buurtcoöperatie Oostelijk Havengebied	Sustainability supporter (Oostelijk Havengebied)
		Participation strategist (municipality)
		Sustainability coordinator (municipality)
Amsersfoort	Duurzaam Soesterkwartier	Board member (Duurzaam Soesterkwartier)
		Project leader (municipality)
Best	Best Duurzaam	Board member (Best Duurzaam)
		Board member (Best Duurzaam)
		Board member (Best Duurzaam)
		Alderman (municipality)
		Alderman (municipality)

Table 2: overview of cases

4.4 Coding and analysis

As the research is conducted through qualitative methods and a large data set of textual materials is collected, these individual pieces of data are categorized in the form of coding. An important

purpose of coding is to discover patterns in the data that lead to the theoretical understanding of social life (Babbie, 2013). The interviews and content are coded in three stages: open, axial and selective. First, open coding is done during the typing and reading the interviews and content. This is when passages are read, and an identification has been made with the key concepts of this study. Second, axial coding is used to identify the core concepts of the study. The data is grouped by the use of the open-code categories to look for analytical concepts. This is done during the main coding process of the data with the online tool MaxQDA and is worked out in the analysis chapter. Finally, selective coding has taken place to identify the central codes in the study to which the other codes relate to. This is done through the analysis chapter and the conclusions in chapter seven (Babbie, 2013; Neuman, 2013). For each concept, a table is made to give a good overview of the results and analysis. At the end of these tables, each case receives a numerical score. This numerical score is based on the similarities and comparisons the cases have. The score will give a better insight on this and will make it easier to draw conclusions.

4.5 Reliability and validity

For research, it is crucial that future researchers can arrive at similar findings and conclusions if they follow the same procedures. Reliability is about minimizing errors and biases in research (Yin, 2014). To guarantee this is proper documentation of these procedures. This study has strictly documented, theory, and methodology (ibid).

There are various ways in which the validity of this paper can be guaranteed. First, the construct validity is often criticized with case studies, as it is difficult for a researcher to develop an adequate operational set of measures that are not subjective (Flyvberg, 2006; Ruddin, 2006). To guarantee objectivity, various concepts have been extracted from governance and transition theory. Every concept is substantiated with various sources and is related to the objectives of this research (Yin, 2014). The concepts are operationalized in different indicators, which are also embedded in theory (ibid).

Second, the internal validity needs to be maintained so there are no errors in the design of the research, which could produce false conclusions (Neuman, 2013). In case study research a problem with internal validity can arise when trying to explain relationships between the dependent and independent variables. It could be problematic when conclusions are made without knowing a third factor could also influence these relationships (Yin, 2014). A way to deal with this is to create a logical conceptual model that is embedded in various relevant theories. The paper upholds a strict theoretical and methodological framework (ibid). Furthermore, the internal validity is kept by strictly structured interviews and interview questions

Finally, the external validity refers to the generalizability of the results that go beyond a specific situation or externally to a broader range of settings and different people (Neuman, 2013, p. 221). With qualitative methods, it is difficult to have high external validity, as results are not always generalizable for a larger population, due to a low number of respondents (Van Thiel, 2015). This study can give insights for future research, and due to strict structuring, it can be replicated, even though the same results cannot be guaranteed.

4.6 Limitations

This study has a time and scope limitation. Due to this limitation, not all factors that could influence the implementation of co2 reduction measures can be taken into account. As already mentioned factors such as trust, cohesion, and collaboration could be part of the positive effects on society when it comes to successful bottom-up implementation. Due to the scope of this study and the theoretical relevance only trust has been attempted to be measured in this study. Although, collaboration is also measured via other factors, such as network building. Important to mention is that next to structural capacity and municipal collaboration factors also various external factors could influence the process of implementation, but the time of this study was too little to also dive into these factors.

5. Contextual description

As this study is performed through five case studies, this chapter will give some background information on the initiatives and the municipalities. First, a contextual explanation will be given on the Dutch energy transition and the connection to bottom-up initiatives. In 2015 the Paris climate accord was agreed upon by almost all countries. The goal is to keep the temperature rise below 2 degrees Celsius and a maximum rise of 1.5 degrees Celsius. For Europe, this means a reduction of greenhouse gas emissions of 40% by 2030 compared to 1990. The European Union has set all member countries responsible for achieving this goal. To comply with this the Dutch government, together with other national parties, has set strict goals for the future: inducing 14% of the energy sustainably by 2020 and 16% by 2023. This goal is tried to be reached via energy restrictions in cities, industries, traffic and agriculture (Schoots et al., 2017).

To achieve the national and international climate goals, the Netherlands works with governmental organizations and private companies. The realization of the energy transition happens mainly on a regional and local level. For example, the provinces have started to work on the development of provincial heat plans and the VNG has started the process of regional energy strategies. Furthermore, the government has Green Deals (sustainability agreements) with local or regional characteristics, and there are many initiatives initiated by cities, organizations, NGO's, and citizens (ibid). Citizens are starting to take matters into their own hands to deal with local problems and needs, to create common facilities and initiate initiatives to improve the life quality in their neighborhoods, examples are energy cooperatives or voluntary neighborhood initiatives. This is especially the case in times where the government is retreating, and there is more need and focus for the self-organizing abilities of citizens to deal with social issues, such as the energy transition (Igalla & Van Meerkerk, 2015).

One of the primary ways cooperatives and neighborhood initiatives try to have an impact on their environment is through the use of solar energy. They place solar panels on a whole neighborhood, social real estate or create a solar park. Research shows collective solar power has been growing; it has tripled in 2016 compared to 2015. In total, at this point, 23,4 MWp solar power was generated on collective roofs and parks. Most of these solar projects are cooperative, which means that a local cooperative or project organization owns the solar roof or park. In total, an investment of 30 to 35 million euros has been made in solar projects, of which is partly financed by citizens and private companies. Smaller projects are mostly 100% collectively financed (Collectieve Zon, 2017). There are however some subsidies and tax arrangement the cooperatives and initiatives can use. The PCR (postcoderoosregeling) is an arrangement based on postal codes that citizens live in. If people (small users) invest in solar energy in their neighborhood, they will get a discount on

their energy taxes. The condition is that these people live in the same neighborhood (within a postal code area) and form a cooperative or an association of owners. The SDE+ subsidy (Stimulering Duurzaam Energieproductie) is an arrangement meant for larger sustainability projects. Every year a large budget is created, and cooperatives can apply for this. This subsidy is an initiative of the ministry of economy and climate (ibid). These are the two central arrangement in the Netherlands that cooperatives can make use of, municipalities can have additional subsidies they offer. As already explained in the methodology this research exists out of five cases, three from Amsterdam, one from Amersfoort and on from Best. In the following part, these cooperatives and initiatives will be elaborated.

5.1 Zuiderlicht

Area	**Amsterdam**
Type of organization	Project cooperative
Board	5 board members & 2 employees & various members
Members	500+
Active since	2013
Focus	Placing solar panels
Solar projects	13

Table 3: characteristics Zuiderlicht

Zuiderlicht is a project cooperative in Amsterdam that focused on the realization of solar projects. The cooperative wants to create a living area in Amsterdam that is based on local sustainable energy production. To do this, they want to build or buy local sustainable energy installations. And they want to buy, produce, and sell this local energy and the by-products. Also, the sharing of knowledge is important for the cooperative and receiving and giving money loans (Oprichting cooperatie, 2013). Citizens can become a member of Zuiderlicht with a donation of 1 euro. With this membership, they can co-invest and profit from the projects and use electricity (Zuiderlicht, n.d.). Zuiderlicht works with roof owners, and they offer them clean energy from their roofs. Zuiderlicht takes care of the financing, the realization, and the maintenance. Residents that do not have a (suitable) roof can work with Zuiderlicht and become co-owners of a solar roof in the neighborhood or a windmill in the area. They can do this by giving Zuiderlicht a loan of 250 euro on which they will receive interest of 2% to 5% a year, and after ten years the loan will be paid back. They also work with an energy supplier that gives Zuiderlicht 25 euros per connection, per customer, per year. Zuiderlicht uses this financial support for the start-up and development of new projects. The organization has a board of

five members that include a chairwoman and treasurer. Furthermore, they have two employees of which one focuses on project realization and administration, and the other employee is responsible for the communication and the member and loan recruitment (ibid).

Online, they show thirteen of their projects. A few of the most recent projects are 34 solar panels on a tennis club, 128 panels on a primary school, and 300 panels on a high school. The tennis club is the first project for which Zuiderlicht has used the PCR. The club was building a new clubhouse and started the collaboration with Zuiderlicht in which the cooperative took over the costs, realization, and maintenance of the 34 solar panels. That they are working with the PCR means that members cannot alone invest but also use the energy. As mentioned before if people want to use the energy they have to live in the same postal code area. The 34 panels diver energy to five households. The 128 panels on the primary school are used for the energy supply of the school, which is also a way for the kids to learn about sustainability. The high school can also make use of own energy via the 300 panels. Next to the panels, the school and Zuiderlicht try to create awareness among the students through tech labs, where they learn how to be smart with energy in the future (ibid).

5.2 Ecostroom

Area	**Amsterdam**
Type of organization	Project cooperative
Board	3 board members & 1 project leader
Members	800+
Active since	2013
Focus	Placing solar panels
Solar projects	7

Table 4: characteristics Ecostroom

Ecostroom is a project organization in Amsterdam that focuses on residential projects. They put together all their projects under one insurer. The project cooperative has a social goal. They want to realize as much as possible energy for the best price. They generate clean energy by placing solar panels on the roofs of companies in the direct environment. The organization has three board members and one project leader. The board members are responsible for the realization of projects, operational tasks, acquisition, growth, and strategy. The project leader maintains the contact with members and the management of projects. Ecostroom has realized various projects. The organization has a main board, but every project has its own board including one member of the

Ecostroom board. It is also expected that every project can manage its processes, Ecostroom is an overarching organization (Ecostroom, 2017). They try to give members that buy solar panels a return on investment of 6% to 8%.

A few examples of projects are BCO Ecostroom, GWL Ecostroom, and WOW Ecostroom. BCO Ecostroom is a project where a minimum of 15000 panels will be placed on a business centrum, which are partly already placed. On the business centrum, there are around twenty buildings on which solar panels will be placed in phases. The goal is that residents in the environment can profit from this. For this project, there is made use of the PCR and de SDE+. GWL Ecostroom was their first resident project for which 352 solar panels were placed. The project has an 8% return on investment. For WOW Ecostroom there are 368 solar panels placed on a hostel. People can become a member of this project for the one-time costs of 15 euro. The expected return on investment is 6% to 8% (ibid).

5.3 Buurtcoöperatie Oostelijk Havengebied

Area	**Amsterdam**
Type of organization	Cooperative
Board	2 board members, 3 coordinators, 1 sustainability supporter & various active residents
Active since	2015
Focus	Improving the neighborhood
Solar projects	2

Table 5: characteristics Buurtcoöperatie Oostelijk Havengebied

Buurtcoöperatie Oostelijk Havengebied is a voluntary cooperative in Amsterdam, which exists out of a large active group of residents whom all live in the same neighborhood. The members want to put in their effort and talents to make the neighborhood more beautiful, more fun, more sustainable and caring. The primary team exists out of three coordinators, two board members, a sustainability supporter and two active residents. People can become members of the organization by paying 60 euros per year or whatever they can spend, with a minimum of 25 euro. These members are involved in the network; they have voting rights during the general member meetings, partake in neighborhood dinners and a free entrance to the monthly neighborhood reading (Buurtcoöperatie OHG, n.d.).

As the cooperative has a broad focus, such as youth, culture, sports. They also focus on sustainability. Since 1 October 2016, they have a sustainability supporter that is bringing resident initiatives in contact and has a focus on solar energy. The municipality commissions the supporter. A few examples of solar energy activities this initiative has organized, are information evenings and a solar roof in collaboration with another cooperative. The 250 solar panels have been placed on the roof of a large apartment building. This project was based on the PCR arrangement. Also, the sustainability supporter has initiated and placed solar panels in his building together with a few other residents. Furthermore, the cooperative has many information evenings varying from sustainability dinners to energy groups, where residents come up with plans to make the neighborhood more sustainable (ibid).

5.4 Amsterdam municipality

Province	**Noord-Holland**
Population	853.312
City council	GroenLinks, D66, PvdA & SP
Districts	7
Average income per household	31.400

Table 6: characteristics Amsterdam municipality

Zuiderlicht, Ecostroom, and Buurtcoöperatie Oostelijk Havengebied are initiatives within the Amsterdam municipality. Amsterdam has various goals for the sustainability of the city in collaboration with the citizens. First, in 2020 they want 20% more energy generation per citizen and 20% less energy use compared to 2013. Second, they want the traffic to be as much as possible emission free. Third, start the circular economy through new forms of production, distribution, and consumption. Fourth, Amsterdam needs to be climate resilient in 2020. And finally, they want 65% of the domestic waste to be separated by 2020. The municipality also has made goals for themselves. For example, sustainably purchasing energy, waste separation, and clean transport. The co2 emissions of which the municipality is responsible needs to be decreased with 45% in 2025. Amsterdam is dependent on national and regional legislation and cannot implement their policies on all areas. In places where it is possible Amsterdam has a leading role: for electric transport and collaborating with citizens to find the best alternative for natural gas (Agenda Duurzaamheid Amsterdam, 2015). The municipality has created a subsidy together with the cooperatives. The municipality wants to stimulate the growth of solar cooperatives in Amsterdam (Subsidie Ondersteuning Amsterdamse zoncoöperaties, 2018). The municipality has seven districts and per

district they have a seperate working method. Every district has its vision and a focus on collaboration and improving the neighborhoods (Gebiedsplannen 2018, n.d.).

5.5 Duurzaam Soesterkwartier

Area	**Amersfoort**
Type of organization	Association
Board	5 board members
Members	50+ active members
Active since	2010
Focus	Sustainable neighborhood
Solar projects	2

Table 7: characteristics Duurzaam Soesterkwartier

Duurzaam Soesterkwartier is initiated by and for concerned residents that through the use of collaborations want to put in an effort for a payable energy bill and sustainable measures. The association has a focus on energy saving, sustainable energy, and sustainable construction. The board exists out of five people and meet up once or twice a month. Next to the board they have various working groups. Also, residents can become a member with a contribution of 5 euros per year. For this amount people can profit of the activities of Duurzaam Soesterkwartier. They will be kept up to date via the website and newsletters, people are allowed to bring in ideas and implement these, and during meetings, they come in contact with experts and other enthusiastic residents (Duurzaam Soesterkwartier, 2011).

The association focuses on different projects. First, a street project for energy saving, one of the streets in the neighborhood is working to collaboratively making their houses energy-efficient and comfortable. This is done through collaborative buying measures. Second, a neighborhood mill. Together with residents, the association wants to invest in a windmill. Third, the sun on a school project. This is about placing solar panels on schools to create a sustainable future. Finally, the living working place is about creating an ecological neighborhood designed by the residents (Duurzaam Soesterkwartier, 2011).

5.6 Amersfoort municipality

Province	**Utrecht**
Population	154.712
City council	GroenLinks, D66, ChristenUnie
Average income per household	36.900

Table 8: characteristics Amersfoort municipality

Duurzaam Soesterkwartier is an initiative within the municipality of Amersfoort. Amersfoort has the ambition to be a co2-neutral and waste-free city in 2030. All their energy needs to be generated sustainable through wind, solar and other clean energy sources. The municipality wants to be a leading party in this transition. To put these plans on paper and execute the first measures they have hired internal and external parties, such as 250 citizens and entrepreneurs and housing corporations (Amersfoort co2-neutraal, 2017). The municipality does have a subsidy arrangement for the costs of the implementation of sustainable and innovative ideas plans. An essential precondition is that the projects contribute to the sustainability goals of the municipality. They offer a maximum of 50.000 euros per application through co-funding. However, this subsidy option is not open at the moment because they already gave a contribution to a few projects (Toekomstfonds, 2018).

5.7 Best Duurzaam

Area	**Best**
Type of organization	Cooperative
Board	5 board members
Members	40+ volunteers & 340 members
Active since	2013
Focus	Making Best sustainable
Solar projects	1

Table 9: characteristics Best Duurzaam

Best Duurzaam is a cooperative that focuses on the sustainability in Best. The cooperative has five board members, more than 40 volunteers, and 340 members. The initiative works closely with the municipality. Both parties have agreed to bear responsibility for the sustainability implementation program jointly. Jointly plan and monitor results and create a communication plan. Concretely the cooperative has three workgroups: 1) technique, that works on the technical aspect for making Best sustainable, 2) education, that focuses on educating youngster on sustainability and 3) communication, that works on the communication and publicity of the cooperative and the municipality. Resident and organizations can become a member of Best Duurzaam. Residents can do this by paying 10 euros a year. For this, they will receive sustainability advice for their house. Organizations have to pay 100 euro per year; they also will receive sustainability advice. Next to this, they can attend a few member meetings per year (Jaarverslag, 2015).

Best Duurzaam has various projects, such as information meetings, education, and a solar park. The solar park is in collaboration with other cooperatives and is placed on a military airport in Eindhoven. It offers the opportunity to people to use solar energy without having to place panels on their roofs. It is an initiative based on the PCR and is available for people living in the area. This park has space for approximately 12.000 solar panels, which can generate around 3.000.000 kWh per year. This will be enough to provide clean energy to a 1000 households per year. The panels will cost 265 euros and will probably have a tax benefit of 29 euros per panel. The solar park is expected to start generating energy at the end of 2018 (Best Duurzaam, n.d.).

5.8 Best municipality

Province	**Noord-Brabant**
Population	29.375
City council	PvdA, VVD, Best Open & D66
Average income per household	39.100

Table 10: characteristics Best municipality

Best Duurzaam is a cooperative in the Best municipality. Creating awareness: the municipality has the ambition to become energy neutral in 2030. Two focal points of the municipality are energy and waste. Together with the Metropol area Eindhoven, they have the ambition to be the first energy neutral region in the Netherlands. All the energy needs to be generated sustainably. Best realizes they need to collaborate, share, innovate and facilitate to realize this (Uitvoeringsprogramma, 2017). In total, the municipality has a maximum of 20.000 euros available for several subsidy arrangements when it comes to social support (Subsidies, 2018).

6. Empirical findings and analysis

The analysis is conducted per concept and per case. All the findings are discussed per case, and a final overview is made. The same order of the research design chapter, for the concepts, variables, and indicators is maintained for the analysis. Each concept ends with a paragraph on the similarities and differences between the cases, and at the end, an integral analysis is made.

6.1 Implementation findings

Zuiderlicht

When it comes to the creation and implementation of plans, Zuiderlicht has mainly implemented solar projects where solar panels were placed on social real estates, such as schools and sports clubs. These projects are realized with the SDE+ (stimulering duurzame energieproductie) subsidy, which is meant for business purposes only (SDE, 2018). When supplying power to residents, the cooperative can make use of the postcoderoosregeling, and this is also the case when social real estate rooftops are too small. The postcoderoosregeling gives members of a cooperative a discount on their energy bill for local and sustainable generated electricity (Postcoderoosregeling, 2018). People can become a member of Zuiderlicht by lending them 250 euros on which they will receive a yearly interest of 2% to 5%, and after ten years they will receive their loan back. On loans in 2014, 2015, and 2016 they have been able to pay 2% interest (Zuiderlicht, n.d.). The goals the organization has set are in close connection with the development and implementation of their plans. “We want to place solar panels, that is the goal.” The implementation of solar panels and the contribution to a sustainable living and working environment in Amsterdam is also referred to in their statutes (Oprichting Cooperatie, 2013). In their plan of action, they mention as an end goal the metropolitan area Amsterdam running on clean energy in 2028. They feel Zuiderlicht can have a direct and indirect substantial contribution by the transfer of knowledge, experience, standards, values, game, and business models and storylines (Plan van aanpak, 2016). They also formulated an intermediate goal, which is to generate 20 million kWh of clean energy in 2020. This means they have to install 40.000 solar panels and three windmills (ibid). Furthermore, Zuiderlicht is aiming at doubling their projects every year, and in the number of projects they are doing (6 to 8 per year) they can see this happening. The cooperative refers to this as the hard goals. Their soft goals are about attracting more members and touching people. When people come in contact with Zuiderlicht, it mostly is the first time they are doing something with sustainability, and the organization hopes it will set something in motion. Their website also focuses on the soft goal of attracting members by creating awareness on sustainability. “Together we form a movement that does not assume limitations, but infinite possibilities, innovative techniques, the versatility of Amsterdam and the creativity of the

people that work and live there" (Zuiderlicht, n.d.). Positive effects on the community are mostly that members are starting to make their house more sustainable. Also, schools are implementing sustainability in their teaching programs. The municipality in Amsterdam does not have a specific view on what kind of projects Zuiderlicht is implementing, and they have not measures the effects that solar cooperatives have.

Ecostroom

Ecostroom is a project organization that realizes solar panels for residential projects. They are the largest energy cooperative in Amsterdam. They realize solar panels projects from a construction background, which cannot be done with only volunteers. All board members have good technical experience and knowledge. The organization has executed various solar projects. A primary goal of the organization is to grow. "We mainly want to focus on project realization, which could be seen as very pragmatic." They see themselves as a down to earth organization that does not need to make all of the Netherlands sustainable. They want to offer quality and truthfulness to their member to maintain trust. They feel they have to stick to their values and not promise what they cannot reach. Their focal points are to be green and profitable. On their website, they communicate their goals as making sure projects sustainable projects are realized, and all involved parties benefit from it. They want to create as much as possible clean energy for the lowest price. All projects have their own board and are responsible for their activities, for every project one board member of Ecostroom is involved (Ecostroom, 2018). Positive effects are seen in the way that people start to think about sustainability and the growth of networks where sustainability is the main topic. The municipality has some knowledge on the projects of the initiative. They are aware that the initiative realizes solar panels and also try to take into account schools and their teaching programs. Furthermore, they mention that Ecostroom is a private initiative, which has contact with various parties of which the municipality is just one. The municipality feels that initiatives like Ecostroom show the will of the people to become more sustainable and that climate change causes people to become more aware of the issue.

Buurtcoöperatie Oostelijk Havengebied

Buurtcoöperatie Oostelijk Havengebied is a voluntary neighborhood cooperative that does have a broader focus than just sustainability. They want to create a better network in the neighborhood when it comes to culture, care, social activities, informal, and formal assistance and sustainability. When it comes to sustainability, the initiative tries to stimulate people to commit. They try to facilitate solar projects, connect parties, and create collaborations. On their website, they

communicate that their resident supporter sustainability tries to strengthen resident initiatives and brings them in contact with each other (Buurtcoöperatie OHG, n.d.). More specifically the sustainability supporter of the initiatives has convinced thirteen households in his building to rent solar panels. Positive effects are seen by the initiative in the interest that is shown by residents for activities. Recently they organized a sustainability evening where 40 people were present. “During these evenings I hear people say they want to organize activities but are not able to, that is the reason for me to connect people with parties such as citizen committees or owners associations.” The organization does see that their reach is small and that this is something they can improve in. When it comes to the municipality, they know about the activities of the initiative on main lines. They indicate that they have to work with various initiatives. They are aware of their most recent meeting and that they work with solar projects. Also, they know that the sustainability supporter connects various parties. When it comes to positive effects, the municipality thinks these kind of initiatives are essential to activate residents to organize something together. Also, neighborhoods start to ask for more information when it comes to subsidies. However, there are only a few neighborhoods of initiatives that are truly successful, mostly it is just enthusiastic and impulsive citizens. Also, in some neighborhoods, citizens cannot afford to be sustainable, which causes them not to have an interest in it.

Duurzaam Soesterkwartier

Duurzaam Soesterkwartier is a voluntary association for energy saving, sustainable energy and sustainable construction for the neighborhood Soesterkwartier. One of their activities is the realization of solar panels by collectively buying them for private use and realizing 100 solar panels for a primary school (Duurzaam Soesterkwartier, n.d.). “You can say that we are successful in the technical part of sustainability, but when it comes to social sustainability it is more difficult.” The organization did not specifically formulate goals, these have grown organically through the years. They did not set strict goals of co2 reduction. They wanted to see where the energy lies of the neighborhood and if they were able to connect this. They also noticed to stay successful they needed to keep staying visible to people. “However, after ten years Duurzaam Soesterkwartier there is still a lot of good energy because we communicate everything that we do, the good and the bad, and that makes people enthusiastic.” Positive effects are seen by the initiative in the enthusiasm of people. Also, other neighborhoods want to know how they have been successful. The municipality has been involved with the start of the initiative, which they initiated. They have ample knowledge on the activities the association works on. According to the municipality, the goal is to have a good collaboration. When it comes to the positive effects, they are a bit negative. They see people be

enthusiastic at the beginning of a sustainability project, but when the process becomes more complicated, lengthy or when promoters of the project stop the project that is finally implemented it is less ambitious than it set out to be.

Best Duurzaam

Best Duurzaam is a voluntary initiative that mainly came to be to create awareness in the municipality of Best when it comes to sustainability. Their activities for the first three years were mainly focused on creating awareness and sharing information. Now they have entered the phase that they start to initiate sustainability projects or they connect to existing initiatives. An example of a solar project they are involved with is a solar park in the area of Eindhoven airport. This is an initiative of various cooperatives. Next to projects they have meetings for their members where they give information and advice on various sustainability topics (Best Duurzaam, n.d.). Their primary activity of awareness creation is also the goal they want to reach. The initiatives think that installing solar panels and keep using the same amount of energy does not change a thing, which is why they started their information evenings. Via their website, they communicate: "We want an energy neutral and zero waste municipality in 2030! We want to create awareness among citizens on the issue of clean energy and help them to save energy, create energy and maybe even store their energy" (ibid). Furthermore, in the interview, they mention that it is crucial to stay externally visible and keep active, this is when they gain the most members. When it comes to positive effects, they see this in the awareness of citizens and the growth of their members. The municipality of Best is closely involved with the initiative, one of the interviewed aldermen is also a member of Best Duurzaam. They are very much aware of the activities and goals of the initiative, which as already mentioned involve awareness creation and information giving. The municipality also stresses the fact that the share of solar energy in Best was low compared to the rest of the Netherlands. Since that Best Duurzaam is working on sustainability initiatives and solar energy this share has been above average. In Best, the first energy neutral apartments in the Netherlands are realized, which is also because of the active efforts of Best Duurzaam. The rise of the solar energy share is seen as a positive effect by the municipality and the fact that there is a lot of interest of citizens in the meetings that Best Duurzaam organizes and the rise in members. The rise in members has according to the municipality to do with low membership costs and getting much information in return.

Variable	**Indicators**	*Zuiderlicht*	*Ecostroom*	*Buurtcoöperatie Oostelijk Havengebied*	*Duurzaam Soesterkwartier*	*Best Duurzaam*
Micro-level	**Development of own plans and**	• Realization of solar projects, mainly on	• Realization of solar projects	• Broad focus (not only sustainability)	• Focused on energy saving, sustainable	• Creates awareness on sustainability

	implementing these	social real estate		• Facilitates residents with solar panel renting	energy and sustainable construction for own neighborhood	• Shares information and advice • Works with other cooperatives on solar energy projects
	Achievement of local goals	• Placing solar panels • Doubling projects every year • Attracting people • Touching people	• Grow as project organization • Offering quality and truthfulness • Being green and profitable • Creating clean energy for lowest possible price	• Stimulating and facilitating • Bringing resident initiatives in contact	• Goals grow organically and are not set	• Create energy neutral and zero waste municipality by 2030 • Create awareness among citizens • Help citizens to become more sustainable
	Positive effect in the form of trust in community	• Members take more action on sustainability • Schools implementing sustainability in teaching programs	• People start to think differently on sustainability • Growth of sustainability networks	• Big interest shown by residents in their activities	• People are becoming enthusiastic • Interest of other neighborhood initiatives	• Awareness of citizens • Growing member count
Numerical score		**5**	**5**	**3**	**3**	**4**

Table 11: overview concept implementation of bottom-up co2 reduction measures

Similarities and differences

When looking at the micro level implementation of own plans and ideas of these initiatives, there are some similarities and differences to be found. Overall, as elaborated in the methodology and context chapter all initiatives have a focus on solar projects. However, Oostelijk Havengebied, Duurzaam Soesterkwartier, and Best Duurzaam do have a broader focus than just this. Also, the initiatives work with various subsidies and arrangements, such as SDE+ and PCR. All initiatives offer membership to citizens or residents for a small amount per year, and positive effects are seen by creating awareness on sustainability and enlarging the social network. The theory has referred to trust as an essential positive effect and form of social capital (Putnam 1993; Walker, 2009; Newton, 2001). However, the effect of trust explicitly cannot be concluded with this study.

Differences can be found in the organizational form. Zuiderlicht and Ecostroom are more professionalized project organizations that have a focus on realizing solar panel projects, and they do this more pragmatically. Their economic goal is to grow as an organization and be profitable, which they refer to as hard goals. They also mention in their interviews that they see this growth in initiatives compared to previous years. Also, Zuiderlicht has made specific economic goals when it

comes to the generation of a certain amount of clean energy. Both organization also have social (soft) goals which refer to touching people and being truthful and green. Buurtcoöperatie Oostelijk Havengebied, Duurzaam Soesterkwartier, and Best Duurzaam are all voluntary cooperatives or initiatives and are more focused on network building, facilitation, creating awareness, and information sharing. They have less economical goals (or none at all) when it comes to growing as an organization or profitability. Interesting is to see that both Duurzaam Soesterkwartier and Best Duurzaam mention visibility as an important success factor. These social goals are more difficult to measure. Moreover, for Best Duurzaam this has to do with growth or the organization, but in member numbers, instead of project numbers. Another interesting difference has to do with the awareness of municipalities on the activities of the cooperatives. It seems that the largest municipality has less of a view on these activities, which they mention is due to the large organization and the many parties they have contact with.

Table 11 gives an overview of all cases and indicators within the successful implementation concept. Overall the cooperatives see similar positive effects in their community. Most mentioned effects were about being sustainable, growing the sustainable network, growing the local network and making people have an interest in sustainability and become enthusiastic about it. However, these factors are not about trust, as theory suggested (Putnam, 1993; Newton 2001 & Walker 2010). This could have to do with the complexity of the concept of trust, which makes it hard to measure. It could be a possibility that trust is necessary to create awareness, action, and enthusiasm, but through this study, this conclusion cannot be made. The higher numerical scores (5) for Zuiderlicht and Ecostroom have to do with the fact that both cooperatives have prescribed their goals more specifically (Matland, 1995), which is an essential factor for successful implementation according to theory. Not only is their description of their goals more clear they are also the only two cooperatives who have social goals that focus on benefiting the community and economic goals that show of their entrepreneurial nature (Evers, 2001). Furthermore, they have clear and transparent plans (Matland, 1995) and already have realized quite a few solar projects. Best Duurzaam has a numerical score of 4 because the cooperative has a broader focus compared to Oostelijk Havengebied and Duurzaam Soesterkwartier. Where the two latter parties only focus on their neighborhood, Best Duurzaam also collaborates with other cooperatives in the area and the municipality, which is a broader development of their plans and social goals (Matland, 1995; Evers, 2001).

6.2 Structural capacity findings

Zuiderlicht

Expectation management: when looking at the near future, the board of Zuiderlicht wants to have a substantial contribution to the energy transition in Amsterdam. The goal to reach this is set for 2025

and many parties are involved to make sure that Amsterdam will have a leading position when it comes to the transition in the Netherlands. To create this vision the main members (board and two employees) of the initiative meet twice a year and think about a long term strategy. Joint image building is done through the 02025 energieontbijt. Every other week there is a breakfast moment where various parties, such as cooperatives, public servants and research agencies come together and discuss various sustainability subjects. During this breakfast research and viewpoints are presented. Also Zuiderlicht works with Drift via 02025. Zuiderlicht does mention that the organization has a very specific focus, which makes not all research relevant for them. The things that are relevant they do take into account. On their website they communicate: “With local energy projects existing knowledge is shared via informal networks and new knowledge is created” (Van Bezeij, 2013). The municipality does not have a specific view on the organizational process of the organization.

Building social networks: Zuiderlicht tries to involve the people that make use of the solar energy on social real estate. For example with a school, they are looking into involving the parents and kids. They want to listen to their needs and try to respond to this. They also have member meetings in the winter and summer time. Then they discus projects. In the winter it is more a general meeting en in the summer they account for their finances and evaluate their process towards their members. They see that the meetings in the summer attract only a select company due to more boring content. In their statutes, it shows that the board will have to give approval when new members sign up for the cooperative (Oprichting Cooperatie, 2013). Furthermore, a good network and interaction with other cooperatives is important. Due to the projects that Zuiderlicht performs they mostly have to wait for the approval of people and institutions, for example, to get approval to use a roof for solar panels. This can be a long an bureaucratic process and contact with other cooperatives can be useful to discuss problems and ask for feedback or solutions for these bureaucratic processes. Other ways Zuiderlicht shares knowledge is to collaborate with parties such as Greenchoice (energy supplier) and Alliander (energy network organization) to see how they can make use of the postcoderegeling. They have also contributed to a marketplace of Alliander. These are collaborations are meant to benefit all parties. When collaborating with the municipality it is a very formal process, mostly for applying for subsidies.

The commitment of local actors: the cooperative exists out of seven members, five board members and two employees. One employee for project development and financial administration and one for communication and member and loan acquisition (Zuiderlicht, n.d.). The board members have careers next to the cooperative. The two employees make the most hours, an average of 20 hours per week. The board members are present during the monthly board meetings,

which is not mandatory for all board members. Three to four times a year the cooperative has meetups with all the seven members, however mostly the complete board is present during the monthly meetings. The employees get a lot of freedom and responsibility of the board, which also causes the working hours of the board go down to a few hours a week. The two employees consult a lot together. Intrinsic motivations are different per person. The employee that has been interviewed thinks the future of children is important. “The preservation of the ecosystem is important, especially with the knowledge that we can do things differently. It is important to change and do this fast. It does not make sense to leave it up to the market or government. The energy transition is urgent and people can do it by themselves. People have developed themselves massively in recent and we have the techniques at our disposal with what we can do anything we want”. “This is a positive approach, a more negative one is based on fear, on what we do not want to happen to our world, the animals, and the children”. Zuiderlicht is trying to manage their process better by hiring someone that manages all the loose ends. Last year the cooperative ran into some problems with the multi-year maintenance plan of buildings and roofs. When trying to install solar panels it is important to know that there is no need for repairs on the roof. It has happened that everything was in order for the placement of the solar panels, but the multi-year maintenance plan came up and showed that repairs were needed in a few years. Zuiderlicht learned that it is important to be bureaucratic and ask for copies of the maintenance plans on time. Now someone in the organization is creating an Excel file in which all the steps of the process need to be checked before they start with the placement of the panels. This also makes it easier for the board to see where which projects get stuck, so we can look more analytically are our process and work more efficiently. The municipality does not work with Zuiderlicht in such a close manner that they know how their organizational processes are managed.

Learning: a few times per year Zuiderlicht has a reflection moment with their board. Also, as already mentioned they have member meetings two times a year where a reflection takes place. Furthermore, the process management described at the commitment of local actors is also an important learning moment. For the municipality, it is important to deal with community money in a responsible way, so they need to evaluate the results of each cooperative, which they do with multiple colleagues.

Ecostroom

Expectation management: the future vision of Ecostroom is, as their goal, to focus on project realization and not waste time on unnecessary administration. They want to professionalize and place three times as many solar panels this year compared to last year. The cooperative mentions

that nothing is decided by one person, the board of three always has a say. However, the projects Ecostroom realizes have their own boards (with one person of the Ecostroom board) and they are independent and can differ from the main organization. They can use their own models and work with other external parties. The projects can make use of standard documentation that Ecostroom provides, but this is not obligated. Due to their high realization of projects, the focus is less on connection with people or members. In the future, they do want to connect more with their members. Ecostroom sometimes makes use of scientific research. They make use of information that can be found on Hieropgewekt, a branched organization of energy cooperatives. When it comes to their basic processes they do not need this anymore and can rely on their own experiences and expertise. Also, every project is different and requires customization, what makes scientific research less relevant. They do make use of research to analyze legislation, to see what legislation works obstructive and then alert local politics on this. Furthermore, they use external expertise when it comes to their marketing and communication. For example, hiring someone to design a flyer. The municipality mentions that they do not have good insights on the organization, it is a cooperative that they are sometimes in contact with. They are aware of some of their activities, such as implementing solar panels and involving schools.

Building social networks: The organization is present during sustainability events in Amsterdam and surrounding areas. This is where they broaden their network, which sometimes leads to contact with roof owners who are open to giving approval for solar projects. Networking is an important activity for the organization. To make sure they get new roofs, members and also in order for people to talk positively about the organization. Networking with the municipality is important, to get them on your side. For every opening, they invite the municipal district manager. Members that invest in solar panels are invited during the opening of the projects. However, after this, the contact with their members diminishes. This is something the organization would like to work on in the future, to involve members more. Right now they are involved via e-mails and an application Ecostroom provides. When deciding on projects the organization looks internally to see if there is enough support. This could refer to the costs of the project and if there are uncertainties, it will be discussed with the board. Within the team knowledge is shared, everyone has a different background and expertise. Also, new employees are included in everything. And knowledge they do not have they will get externally, for example, a notary and fiscal lawyer. The municipality is aware that Ecostroom has to deal with various parties, such as premise owners, renters, technicians, energy suppliers, network operator and a municipality that wants to contribute. Also is the municipality aware of that fact that the energy transition can only happen through collaborations.

The commitment of local actors: Ecostroom is a cooperative with three board members and one project leader. The board members are responsible, among other things, for the realization of projects, acquisition of roofs, organizational growth, and strategy. The project leader is responsible for contact with members, operational matters and the management of projects (Ecostroom, 2017). The hours the board members put in differs from 40 hours to 20 hours, this depends per person and per time of the year. In the summer, for example, one of the interviewed board members put in 20 hours instead of 40. The project leader puts in an average of 24 hours a week. They emphasize that it is not a voluntary organization. They expect the project leader to put in more hours in the future and they are planning on hiring another person. As mentioned before the organization sees a growth for the future and this means they need to have good administration and management. Members of the organizations have a lot of freedom. For example, the project leader is free to go where he wants and initiate ideas. He created a customer relationship management system on own initiative. “This to manage customer contact in a better way, which is now more streamlined”. He learns a lot of the board members and tries on his turn to professionalize the cooperative more. “To professionalize the organization more, that is my contribution”. Next, to a CRM system, he looked for a system for the bookkeeping. This is important for the functioning of the organization. Furthermore, he is free to have contact with parties like Aliander and to go to events to network for roofs. However, when negotiations with parties like Aliander fail, the board members will take over. Intrinsic motivations can be found in interest in sustainability. “The motivation is partly ideal. You want to realize something green. On the other hand, it is about the fun to realize projects”. The projects are complex, the organization has to deal with an energy supplier, Aliander, government, and residents. This all needs to come together to place the solar panels. The coordination of the project management needs to be of high quality, which is also seen as a lot of fun. “Every project is a challenge and it is fantastic to do something that is appreciated by people”. According to the municipality, Ecostroom is a small and flexible organization. They are seen as very determined, one of the projects has taken a year to be accomplished and Ecostroom did not give up until it was realized.

Learning: Reflecting and evaluating happens on an informal basis and in between tasks. After tasks or projects are finished Ecostroom will discuss the events. The standard is always raised. “Sometimes we make decisions that are not optimal and we see this”. An example is that the cooperative does not put a lot of time in their relationship with the municipality and then they see that the municipality works harder for other cooperatives. They think they might have to put more effort in their networking with government and roof owners. The municipality thinks of themselves that they also can put more time into evaluating with parties such as Ecostroom. They are a more

executive organization and good evaluations will cost a lot and the municipality does not have that kind of budget. Cooperatives do have to justify their results and spendings.

Buurtcoöperatie Oostelijk Havengebied

Expectation management: this cooperative wants to make the neighborhood fossil free and create a local circular economy, they want the best of the best and as soon as possible. They have not written this vision down concretely. They want to start a process of awareness and progress among residents. This vision is not participatory based on the moment. There has been a meeting with the board where the sustainability supporter has mentioned the plan. However, the cooperative is starting a process to create a future vision for the neighborhood together with the board and residents. On their website, they mention: "we are going to look for the wishes and dreams of everyone that lives and works in the Oostelijk Havengebied. How do we want to live in our neighborhood in 2025? How should the living quality look like in 2025? With a large group of residents and entrepreneurs, we would like to think the upcoming fifteen months about the future of the neighborhood" (Buurcooperatie OHG, n.d.). From July until November 208 they will receive input for this via an online survey and face to face conversations (ibid). The municipality indicates that they have the impression that the cooperative gets signals from the neighborhood and responds to this. They say of the cooperatives in Amsterdam there are only a few that have a specific vision, mostly they act quite impulsive. Although, they do mention they do not have a good picture of it.

Building social networks: As already stated in their goals, for this cooperative connecting parties is an important activity. They have contacts with residents, municipality, and other cooperatives. An example that is mentioned is that another cooperative, which only has a small board left, is being facilitated by Oostelijk Havengebied to make sure they reach people or can organize meetings. In online documentation, they mention that during these meetings residents share their knowledge, their experiences and this way to come up with new plans (Buurcooperatie OHG, n.d.). Also, there are parties in surrounding areas that want to place solar panels but do not know of each other's existence. Oostelijk Havengebied tries to connect these parties and let them get to know each other. The cooperative has the ambition to be inclusive for its members, however, this could be better managed. It is possible for everyone to walk in their community center. Interesting is to see that the neighborhood mainly exists mainly out of white citizens that are highly educated and have good incomes. The cooperative is also founded by this group of people. They also try to share knowledge where possible, but it is not an explicit goal to do so. The municipality is aware that connecting initiatives with each other is a goal of the cooperative. The energy meetings

are an important way for the cooperative to be inclusive, deliberative and share knowledge. This is a moment where they have close contact with the inhabitant of the neighborhood and the municipality and they receive a lot of input when it comes to projects. During one of the recent meetings, the municipality board member of sustainability for the east district was present. He emphasized the importance of cooperation between residents, neighborhood organizations, politics, and energy companies. "We all stand before a big ambition and we need each other to make that happen" (ibid). The cooperative also has contact with the municipality once in a while, which is not on a fixed basis. Another way to increase their network and knowledge is the 02025 platform.

The commitment of local actors: The cooperative exists out of a large group of active residents that live in the Oostelijk Havengebied. Their main activities are run by eight members, varying from board members, coordinators, residents, resident supporter and hosts (Buurtcooperatie Oostelijk Havengebied, n.d.). One of the resident supporters is focused on sustainability as gets paid for 12 hours but puts in around 20 hours per week. For residents, this differs and can be incidental and periodic. The support of residents depends on their affinity with the subject at hand. Hosts do support on a regular basis and for a longer period of time. There is not a lot of authority, the organization is very flat and this means they can initiate a lot of initiatives. Justification is necessary, but members are free in what they propose and how their agenda is planned. When it comes to intrinsic motivation it mostly is about sustainability. “I like working on this in my own neighborhood. An organization like this is very useful because of its facilities, initiatives, and channels”. For other members, it is mostly about being involved in the neighborhood. And the fact that they can interact with people that they would not meet in another way. “It is a community here”. The municipality finds it difficult to talk about the commitment of the members. They do think it is impressive what the cooperative does and that play an important role in activating residents, even though the people that live in the neighborhood are already active. This due to many highly educated people.

Learning: every year the cooperative has a festival. After this, they have a reflection moment with the coordinators and residents. They discuss what went well and what can be done differently the next year. Also during openings of projects, they try to invite the sustainability alderman and someone of the housing corporation. The cooperative emphasized that they are not a learning organization. The municipality and the cooperative have conversations to see what they need facilitation for. Oostelijk Havengebied also has delivered a plan to the municipality on what they want to do for the upcoming year. And at the end of the year, they need to deliver a short rapport with what they have done for the money they have received.

Duurzaam Soesterkwartier

Expectation management: the initiative has not created a future vision. They have co-written the sustainability vision for the wagenwerkplaats in Amersfoort, which was used in the past for the maintenance of freight cars and is now used as a citizen initiative where creativity and culture are the focal points. This vision included gasless construction, maximum effect on water infiltration, sanitation of areas, focus on electric driving and bike friendliness, and work on social sustainability (Masterplan WWP, 2017). What Duurzaam Soesterkwartier did have as an idea for the future is to see if they were able to quit the initiative after five years, because they achieved so many of their goals: “the funny thing was that we thought in 2010 to see if we could quit in five years, that we had accomplished so much by that time”. They have become aware of the fact that this will not happen due to many changes and that there still is a lot to win on social domain. When it comes to joint image building the initiative is very much aware of the fact that collaborating will save time and costs. The projects and initiatives within Duurzaam Soesterkwartier have contact amongst each other to see what else can be done to make the neighborhood more sustainable. They have made use of research by working with students from various universities (TU Delft and Saxion). Also, Arcadis (an advising and engineering agency) has performed a feasibility study for Duurzaam Soesterkwartier. Finally, Platform 31 has set aside a subsidy for research. The municipality was very much involved during the creation of the vision for the wagenwerkplaats, which they also see as partly a vision for Duurzaam Soesterkwartier. They also indicate that working together is important and makes such initiatives stronger. For the vision of the wagenwerkplaats the municipality was involved together with local citizens and engineer agencies.

Building social networks: Duurzaam Soesterkwartier works with working groups. Members and local residents can start a project if there is enough interest and support. “The mindset is that you do it together, to improve the households”. “That is also the strength, collaborating, with your neighbors, with your neighborhood”. The initiative also created the concept of street ambassadors, which are people who will sit with residents to see what they want in terms of sustainability and shares his or her own knowledge. Then they will divide tasks to make sure they can achieve the project on the district level and not just on the individual level. On the basis of this concept, the initiative has been able to isolate many houses within a year. Furthermore, they have recurring meetups with local residents. These are meetings about subjects such as solar panels and other sustainable energy sources (Duurzaam Soesterkwartier, n.d.). Deliberating and networking with the municipality is another important factor for this initiative. This sometimes causes delays in the process, due to the slow response and action of the municipality. The effectiveness of this collaboration has to do with the type of municipal executives. Some executives are very benevolent

and stimulate bottom-up initiatives and others are opposing such initiatives. At the moment Duurzaam Soesterkwartier says that the municipal executives are lazier than opposing. They think that bottom-up initiatives can manage on their own. The municipality is aware of the meetings the initiative organizes where people come together. Also, they see that the various working groups work on broadening their network by using their personal and professional contacts.

The commitment of local actors: The initiative has around 200 members, that donate five euros per year. Almost every member has put in some effort in the past ten years. For example, thinking about ideas or pouring coffee. There are 50 members that are really active, they are part of the working groups or the board. The board exists out of five members and meets up once or twice a month (Duurzaam Soesterkwartier, n.d.). The time that is put into the organization varies per person, it is mostly only one or a few hours a week. Members are free to come up with ideas, but once an idea is approved upon it is expected that you will execute this. Internal motivations are also different per person. Some people do it because of a religious background. Others because of climate change. “It is nice to be busy, also with each other, and making sure we achieve results”. There are quite some people with an HBO or University education that do this work and are working in the green sector. According to the municipality, the initiative is very active when it comes to direct actions, such as placing solar panels. However, on board level, there seems to be little time to be spent on contacts with members.

Learning: reflection mostly happens during their half-yearly meetings. Sometimes it is also necessary to come together after an incident. It is then important to talk it out. According to the municipality, the working groups do have time for reflection also with the municipality. However, on board level, the municipality is not aware.

Best Duurzaam

Expectation management: Best Duurzaam has created a vision two years ago. They communicate this on their website: “a sustainable, affordable local energy supply and careful handling of the raw materials of the earth is important for future generations. This can only be realized through a change of people themselves” (Missie en Visie Best Duurzaam, n.d.). This vision is mainly created within the board. The board did present the vision to their members for the final establishment. Best Duurzaam did get feedback from their various working groups to fine-tune the vision. Next to this, they have had many conversations with the municipality, which was also creating an own vision. This resulted in an implementation program. The cooperative has tried to have a form of joint image building by executing an effect measurement. However, they have not evaluated this due to time limitations. They did get some highlights out of it. Most important is that members feel that they are being

listened to. And they could tell something about their motivations to be sustainable, which gives Best Duurzaam insights for their activities. Also, the initiative sees that they reach a certain effect by the number of members that are present during meetings. The municipality sees that Best Duurzaam has an active board and active members. During member meetings, the board asks what members think is important and they also discuss their programs with the municipality. About the vision, the municipality mainly refers to their own future vision to be energy neutral and waste-free.

Building social networks: the cooperative is very involved in their community. They are present during community meetings, residential meetings, clubs, associations, school and so on. They feel that it is important to do so, so they can see where there are possibilities. Every neighborhood needs a different action plan, so it is important to have a good network and see per case how you can make use of opportunities. Best Duurzaam thinks that their strong appearance in the community makes sure that good people come and volunteer for the organization. When it comes to knowledge sharing that cooperative is present during knowledge sessions in South East Brabant, where they share and receive knowledge. Also, for a solar park (Welschap) they work with various cooperatives with whom they exchange expertise and experience. Furthermore, Hieropgewekt organizes an annual meet up where cooperatives give updates on their projects and activities. When sharing experiences here Best Duurzaam thinks also other cooperatives can benefit from this. Finally, the cooperative gets a lot of its expertise from the community. They do not feel a public servant can have the same amount of expertise. According to the municipality, the cooperative has an active board and members. Best Duurzaam has various working groups, one for technique, one for education and one for communication (Jaarverslag 2015, 2016). Municipal workers also have attended meetings of the cooperative and have seen that knowledge has been shared in the form of inviting experts to tell something about sewage systems, architecture, heat pumps and solar panels. Also, other parties are invited, depending on the theme of the meeting, such as housing corporations, Most of the time the municipality, housing corporations and Best Duurzaam are present during these meetings to give information. As already mentioned there is a close cooperation between Best Duurzaam and the municipality of Best. They have created an implementation program. This program entails how both parties are going to reach the ambitious goals they have set. “The agreement is that the cooperative Best Duurzaam collaborates with the municipality and that on the basis of mutual responsibility both parties work on the implementation program” (Jaarverslag 2015, 2016).

The commitment of local actors: Best Duurzaam has a board of five members, that includes a chairwoman, treasurer, and secretary (Best Duurzaam, n.d.). Furthermore, the organization consists of various working groups that have around active 40 volunteers. Also, around 30

volunteers have signed up but the cooperative does not have the time to approach them. The volunteers are approximately active four hours per week. Important to state is that the members are not a good reflection of society. Most of them are 50+, highly educated and are homeowners. Intrinsic motivations are about being aware of the environment and the future of this. And to not just talk the talk, but put in real effort. And it could help to enlarge the local network.

Learning: the cooperative does not reflect on a strict basis. The board does focus on reflection and think about the things they do or do not do well. An example is looking through the debtor list and reflect on reasons why people canceled their membership and what they should do about it. Professionally seen they have the right insights, however, they find it hard sometimes to find volunteers for non-core activities. Most important for them is to put energy in sustainability if they have ten hours to spend they want to send nine of these hours on a solar part or information evening. This is what matters most. The municipality has a covenant with parties that are involved in making Best sustainable. With these parties, they have a few times per year a project meeting. This is a moment that the municipality as Best Duurzaam reflects on learning points. A tension that occurs here are the working hours. These meetings are sometimes difficult to arrange due to day working hours of the municipality and night working hours of the cooperatives. To be able to deal with this flexibility of both parties is important.

Variabele	**Indicator**	*Zuiderlicht*	*Ecostroom*	*Buurtcoöperatie Oostelijk Havengebied*	*Duurzaam Soesterkwartier*	*Best Duurzaam*
Expectation management	**Shared future vision based on a shared definition of sustainability**	• Have a substantial contribution to energy transition in Amsterdam • Discussing future strategy twice a year with broad and employees	• Focus on project realization • Professionalize and place three times as many solar panels • Nothing is decided by one person • Would like to focus more on members in the future	• Have a fossil free and circular economy in future • No written down vision • Upcoming 15 months OHG will create future vision with various parties	• No own vision • Co-created vision for the wagenpark Amersfoort in collaboration with various parties	• Sustainable earth for future generations • Vision created by board, but with feedback from members
	Joint image building through interaction and authoritative (scientific) research	• Every other week discussing research and solutions via the 02025 energieontbijt • Working with Drift	• Little interaction with members after project realization • Using information from Hieropgewekt • Analyzing legislation • Using external expertise for marketing and	• Get input via survey and conversations for future vision	• Working with students from different universities • Arcadis executed feasibility study • Subsidy for research via Platform 31	• Effect measurement among members and non-members

			communication			
Building social networks	**Inclusive and deliberative process while sharing knowledge and exploring solutions**	• Involving parents and children • Half yearly member meetings • Collaborations with cooperatives • Collaborations with energy companies	• Present at various sustainability events • Networking helps to get roofs for solar panels • Members are invited during opening of solar panel projects • Board and employees share own expertise and experience • Other knowledge is gained externally	• Connecting parties • Sharing knowledge during member meetups • Ambition to be inclusive, but could be managed better • Open community center • Share knowledge where possible • Contact with municipality on flexible basis	• Working groups • Street ambassadors • Recurring member meetings • Deliberation and networking with municipality • Slow response of municipality can cause delays • Effectiveness municipal collaboration depends on executives	• Very involved in community • Present during various knowledge sessions • Using expertise of community • Working groups • Collaboration with municipality through implementation program
Commitment of local actors	**Development of bottom-up initiative from ad-hoc to more formal through activities of members**	• 5 board members and 2 employees • average of 20 hours per week for employees • Professionalization steps	• 3 board members and 1 project leader • Put in 20 to 40 hours a week • Professionalization steps	• Resident supporter puts in 20 hour per week • Support of members depends on their affinity	• Board of five • Working few hours per week • 50 active members	• Board of five • 40 active volunteers • Approx. active 4 hours per week
	Members are driven by intrinsic motivations and are given responsibility and freedom	• Future of children and nature • Energy transition urgency • Lot of freedom and responsibility for employees	• Realize something green • Realize complex projects • Members have freedom but need to be accountable	• Working in own neighborhood • Sustainability • Not a lot of authority	• Focus on climate change	• Awareness of environment and future • Be part of a local network
Learning	**Social learning through reflection on perception, strategies and solutions**	• A few times a year reflection moments with board • 2 times per year reflection with members	• Reflecting and evaluating on informal basis • Raising standard • Can put more effort in networking	• Yearly reflection • Not a learning organization • Reflection with municipality	• Mostly during half yearly meetings • Sometimes during incidents • Working groups have reflection with municipality • Members have freedom	• Does not reflect on strict basis • Board does have informal focus on reflection • Meets up few times a year with municipality to reflect on learning points • Members have freedom
Numerical score		**3**	**3**	**2**	**2**	**4**

Table 12: overview concept structural capacity

Similarities and differences

When looking at the shared vision of these bottom-up initiatives is that most of the initiatives do not a have a specific written down future vision. There are a few economic goals formulated, such realizing a certain amount of co-2 reduction. Only Ecostroom specifically mentioned they want to place three times as many solar panels compared. Other visions are more related to the local energy transition and are broadly defined. These broadly defined visions are created more with other parties, especially when it comes to Zuiderlicht, Duurzaam Soesterkwartier, and Best Duurzaam. Buurtcoöperatie Oostelijk Havengebied has mentioned they are starting the process of creating a neighborhood vision with various parties. Also, most visions are closely related to the organizational goals discussed earlier. The joint image building in these cases is mainly done through working with different parties, such as Drift, 02025, Hieropgewekt and universities. Best Duurzaam is the only cooperative that has executed own research through an effect measurement but did not have the time to evaluate the results adequately. Scientific research, however, does not seem to be a crucial part of the internal process. It is something that might be helpful for the initiatives, but due to time and costs, it is not part of the main activities. Besides research, the initiatives, especially the voluntary ones, do have interaction with their members and the municipality to see what the needs are and implement this in their activities. The smaller municipalities of Amersfoort and especially Best are very involved in the vision creation of the initiatives.

For the internal and external network of cooperatives, they all try in one way or another to involve their members and other parties. This is mainly done through member meetings, attendance at events, collaborations with cooperatives or municipalities and creating working groups. The cooperatives share knowledge internally with their members. Externally they work with several parties such as energy suppliers, municipalities, 02025, Hieropgewekt and other cooperatives. The voluntary initiatives Oostelijk Havengebied, Duurzaam Soesterkwartier, and Best Duurzaam have a big focus on a tight-knit network within their neighborhoods. For Oostelijk Havengebied the connections between parties are important, and they look at manners to create this. Soesterkwartier finds it essential to collaborate closely with residents. Moreover, Best Duurzaam is very involved in their community and have a broad network with different social organizations. They want to come up with different action plans per neighborhood as there are different needs everywhere and for this, a good network is needed. This network also causes the organization to have many volunteers. These voluntary cooperatives also have various meetings where they share information and come up with new plans together with members. Zuiderlicht and Ecostroom do involve their members through invitations for openings, members meetings (twice a year) and collaborating with schools to educate the youth. For Ecostroom networking is very important to find roof owners and for people to talk positively about the organization. What stood out for all

initiatives, during interviews and the content analysis, the initiatives takers, board members, members and neighborhoods (internal network) consist mainly out of white, is most cases elder, higher educated people with good salaries.

The commitment of local actors has many similarities for the initiatives when it comes to member count or board count. Most initiatives have around five key members (board and employees). Furthermore, the initiatives have quite a focus on professionalization. For Zuiderlicht and Ecostroom this has to do with professionalization in their internal processes, such as hiring people for the management of organizational processes and using CRM or bookkeeping systems. For Oostelijk Havengebied, Duurzaam Soesterkwartier and Best Duurzaam the professionalization is about being able to put in more hours and start creating more economic goals. For all initiatives members are given freedom and responsibility to take the initiative in the form of ideas for actions, attending events and making contacts or a network. An important factor here is that there needs to be support for these initiatives and once agreements have been made they need to be kept. Intrinsic motivation mainly has to do with a better future for the youth, being green and sustainable on a local scale, preserving the ecosystem, the fear of what the future holds and the urgency of the energy transition. These are all quite idealistic. Ecostroom added to this the fun of realizing complex projects, and Best Duurzaam saw it as an opportunity to be part of an enlarge the local network. The hours that the initiatives put in differ from project organization to voluntary organization. The project organization members put in hours between 20 to 40 per week. The variation has to do with the type of responsibilities members have and the yearly period. For the voluntary initiative, it is more about a few hours per week because the members also have a job on the side.

Learning through reflection happens on an informal basis for the initiatives. And the outcomes in the cases of Zuiderlicht and Ecostroom have to do with their professionalization need. The initiatives meet up once in a while and discuss the organizational processes, and these are going, there is no formal moment for this. Reflection with the municipality mainly refers to being accountable and showing how subsidies and budgets were spent. Best Duurzaam has mentioned a tension here due to working hours. The municipality works during the day, while the cooperative is available in later hours due to their jobs. Being able to be flexible for both parties is essential in this case.

Table 12 shows the overview of this concept. The numerical scores show that overall the cooperatives are mostly equivalent in their structural capacity. All parties do have structural capacity when it comes to a shared future vision, image building, knowledge sharing, intrinsic motivations, and learning. Zuiderlicht and Ecostroom have a score of 3 because of their clear and specific future visions and a combination of hard and soft goals. They do have a very inclusive and deliberative

internal network, where ideas and projects and discussed within the board and with the employees, but members outside their internal organizations are not (yet) closely included. Networking is mainly about creating better brand awareness and to bring in new projects. This again can be seen in their social and economic goals. Especially for a professional cooperative, this is an excellent way to grow and be profitable. However, the theory states that for bottom-up initiatives it is essential to have an internal as an external network that is inclusive and that all parties can contribute to ideas (Kemp, 1998). Oostelijk Havengebied and Soesterkwartier received a score of 2. For Oostelijk Havengebied both the internal and external inclusiveness could be managed better. Also, the cooperative only has one resident supporter that has a focus on sustainability, and they only reflect on a yearly basis and emphasize that they are not a learning organization. Soesterkartier does not have a vision or goal for the cooperative, and they do not use many financial resources, which could make the realizations of larger projects difficult. Best Duurzaam (4) has an extensive internal and external network and many members that actively invest in the organization. They are very involved in the community and are aware that building relationships with various stakeholders is crucial for their development.

6.3 Hands-on municipal facilitation findings

Zuiderlicht

Creating awareness: Amsterdam has various goals for the sustainability of the city in collaboration with the citizens. First, in 2020 they want 20% more energy generation per citizen and 20% less energy use compared to 2013. Second, they want the traffic to be as much as possible emission free. Third, start the circular economy through new forms of production, distribution, and consumption. Fourth, Amsterdam needs to be climate resilient in 2020. And finally, they want 65% of the domestic waste to be separated by 2020. The municipality also has made goals for themselves. For example sustainably purchasing energy, waste separation, and clean transport. The co2 emissions of which the municipality is responsible needs to be decreased with 45% in 2025. “Amsterdam is dependent on national and regional legislation and cannot implement their policies on all areas. In places where it is possible Amsterdam has a leading role: for electric transport and collaborating with the citizens to find the best alternative for natural gas” (Agenda Duurzaamheid Amsterdam, 2015). The Amsterdam municipality gives attention by speaking about their ambition that every person in Amsterdam should have a solar panel on their roof. However, now this cooperative thought is more difficult to be found, according to Zuiderlicht this is because of the large and non-transparent organization, they have to deal with too many people. It depends per public servant how flexible they are. The sustainability department if very active, however, they also have to deal with other parties, which makes the process complex. Together with Aliander, the municipality has established the zoncoalitie. This is a group of organizations that try to collect roofs and unburden the roof owner

during this process (Zoncoalitie, n.d.). However, according to Zuiderlicht, this does not work correctly yet. It should have been a kind of dating site that connect this roofs with cooperatives. However, it has not made these connections yet for any cooperative. What is happening now, is that the zoncoalitie comes in between the roof owners and cooperatives with a lot of bureaucratic hassle. Also, the intention of the zoncoalitie to unburden roof owners clashed with what cooperatives are already doing. Furthermore, the municipality organizes events, such as Duurzaam 020. They also attend events other parties organize, such as Make the City. They also have a communication plan in which every month a sustainability subject is highlighted.

Assistance in resources acquisition: the municipality has created a subsidy together with the cooperatives. This subsidy can be used for the professionalization of cooperatives. The municipality wants to stimulate the growth of solar cooperatives in Amsterdam (Subsidie, 2018). This is something Zuiderlicht is very happy with and makes them feels supported. Also, Zuiderlicht is starting to learn whom they need to have contact with within the municipality.

Assistance in coordination and implementation: The municipality has district coordinators, they have a broad network per city district, and this is very helpful for Zuiderlicht. Furthermore, the municipality offers information on their website, and they have a solar atlas that shows which roofs are appropriate for solar panels. And there is a regional energy window where people can go with questions. Overall the municipality wants to give the cooperatives room to take action, even though showing accountability is very important. The municipality has district coordinators that have a broad network per region and know who knows what and how to connect parties. This is something that has helped Zuiderlicht in the past. Permits and projects are not expedited at the moment; however, this is something the municipality wants to be able to do this in the future.

Ecostroom

Creating awareness: the municipality is present during meetings. For example during the energy breakfast of 02025. A public servant of the sustainability department was present here and engages in conversation with the cooperatives. A few years ago an agreement was made, which resulted in the zoncoalatie that should have taken over the acquisition of solar panels. A problem here is, according to Ecostroom, that these kinds of organizations have different interests than the cooperatives. The zoncoalitie is trying to maintain itself, and Ecostroom works from a residential interest. Thus, this party is competing with cooperatives that have become their members. In short, there is a party that is governmentally financed that is taking roofs of the market, and this is something that is bothering Ecostroom. “The government does not need to get involved and that this is disrupting the market.” In Amsterdam, there is a difference between central and more local

government. The central government is mostly in charge of the money and is standing a bit further from the residents. The local districts are the executive organs of the municipality. The central municipality creates communication campaigns with different themes that will have to focus for about two weeks. Some of this campaigns are successful, such as the natural gas campaign, but others are less successful and fade away. The communication support in Amsterdam is very little at the moment, and this makes it difficult for the city districts to make a maximum effort. Even though communication is essential to get in contact with residents and cooperatives and to reach municipal goals.

Assistance in resources acquisition: according to Ecostroom Amsterdam makes more time and budget available than other municipalities. There is a subsidy for cooperatives that is set for two years. Furthermore, they offer residents loans to realize co2 reduction, so that also people with less money can install solar panels. And there is a subsidy that stimulates roof owners to make their roof available. If they do so, they will receive compensation between the 5000 and 20.000 euros (Dak voor de Stad, n.d.). Most of this is taken care of by the central municipality and if people are interested in this, they to ask for this themselves and be able to find the right people.

Assistance in coordination and implementation: Ecostroom does not have to do a lot with permits. The municipality does not expedite sustainability permit or projects, and this might only be the case with tenders. When it comes to other sustainability arrangements, it is sometimes less efficient due to the large organization. However, there is much goodwill. The city districts have contact with the residents and are aware of the sustainable initiatives that are going on per area. They connect parties with each other. However, when parties need subsidies, they have to contact the central government. Furthermore, 02025 is a party that organizes events and is also deployed by the municipality to connect networks. The municipality feels that this party is good at what they do and that it is better to outsource this than do it themselves.

Buurtcoöperatie Oostelijk Havengebied

Creating awareness: the municipality has a various program with which they try to attract attention for sustainability in the city. Right now there is a big focus on stopping with the use of natural gas in 2040. They do this by starting campaigns, hang up posters and making movies. It is sometimes difficult for the public servants to do this due to a small team. Amsterdam has specifically chosen some areas in the city to be active due to the presence of bottom-up initiatives. This is where they want to involve residents in making the city more sustainable. Also, they facilitate these bottom-up initiatives through the energy activities and meetings of 02025 (02025, n.d).

Assistance in resources acquisition: on a financial level the cooperative receives a budget per year form the municipal area plan. Next to this, the municipality offers different options for subsidies; however, it is difficult to find information on this. According to Oostelijk Havengebied, the municipal website is mainly built from a sending point of view.

Assistance in coordination and implementation: the cooperative has good, frequent and informal contact with the district teams. These contacts have to do with when the cooperative needs someone within the municipality or they need an appointment with the alderman. The municipality is very open in this according to Oostelijk Havengebied. Also, the contact with the sustainability department, which is a central department, are good and a bit more formal. For this cooperative the municipality is approachable. The municipality does once in a while facilitate collaborations, for example when a council member passes through information, but this does not happen often. As well as Oostelijk Havengebied as the municipality sees that there are very ambitious plans. The government has economized the last few years, and the Netherlands has become a participation in society. This also means that there are high expectations for bottom-up initiatives, which are probably not realistic. Especially the voluntary initiatives are not as professionalized as formal organizations. Oostelijk Havengebied would like for the municipality to share more information and knowledge. They understand that it is hard for the municipality to reach residents of neighborhoods and that is why it is important that they keep investing in local supporters that have close contacts, such as they did for Oostelijk Havengebied. The sustainability supporter would like to be facilitated for more hours by the municipality.

Duurzaam Soesterkwartier

Creating awareness: Amersfoort has the ambition to be a co2-neutral and waste-free city in 2030. All their energy needs to be generated sustainable through wind, solar and other clean energy sources. The municipality wants to be a leading party in this transition. To put these plans on paper and execute the first measures they have hired internal and external parties, such as 250 citizens and entrepreneurs and housing corporations (Gemeente Amersfoort, 2017). Right now a new municipal council has to be created. The future vision depends on this council, which means that there might be a delay on the goals of 2030. Duurzaam Soesterkwartier does not think it will be possible to reach the municipal goals by 2030. Also, there is no window where people can go and ask questions about sustainability. People and cooperatives need to find this information themselves, but this is quite difficult, and it is unclear where to find it. They find a fixed and good point of contact important and are missing this at the moment. The municipality argues they have had an initiating role. “This is important when there are no initiatives yet to lay down the seeds. After this citizens become aware

and interested, this is when a plant grows, and citizen initiatives start". After this, the municipality should start with stimulating and help the citizens. It is important not to take over but to facilitate. After stimulating it is all about facilitating. The amount of awareness creation depends on the people in charge and if they have to drive to make things happen.

Assistance in resources acquisition: during the first meeting of Duurzaam Soesterkwartier the municipality has made a certain amount available to organize this meeting and to place solar panels on one resident's house. After this, there has not been much financial support from the municipality. The municipality does have a subsidy arrangement for the costs of the implementation of sustainable and innovative ideas plans. A necessary precondition is that the project contributes to the sustainability goals of the municipality. They offer a maximum of 50.000 euros per application on the basis of co-funding. However, this subsidy option is not open at the moment because they already gave a contribution to a few projects (Toekomstfonds, 2018). Duurzaam Soesterkwartier looks critically to financial help because they do not want to lose too much time in accounting for their spendings and to act without other interests. They have a budget of 1500 euro for maintenance and organize meetings. They call themselves deliberately broke.

Assistance in coordination and implementation: the cooperative is working as sustainability ambassadors. On behalf of the citizens, they have contact with the municipality. This means they have contact with the alderman once in a while and tell them what is happening in the neighborhood and how citizens are feeling. Overall individual civil servants are very understanding and want to put in efforts for the initiatives; however, the municipal system is very slow. Also, the speeding up of projects and permits does not happen. On other projects, according to the municipality they have expedited plans by already implementing a plan without a formal planning document.

Best Duurzaam

Creating awareness: the municipality has the ambition to become energy neutral in 2030. Two focal points of the municipality are energy and waste. Together with the Metropol area Eindhoven they have the ambition to be the first energy neutral region in the Netherlands. All the energy needs to be generated sustainably. Best realizes they need to collaborate, share, innovate and facilitate to realize this and Best Duurzaam is one of the central partners in this (Uitvoeringsprogramma, 2017). These ambitions they communicate to projects developers and the region. "It is important to show that you are serious as government and that you invest in sustainability. Then it is also easier to ask the same type of effort from other parties". The municipality also speaks during meetings of Best Duurzaam to show their face. They are facilitating initiatives of other parties, such as Best

Duurzaam. Also, the municipality does not have windows yet where people can come and ask for information. They do want to look at ways to make the information provision easier and simpler so that people do not have to wait for the information evenings. Finally, the municipality finds it important to also lead as an example function. They try to make sure there are enough e-bikes for the staff, that company cars are electric and solar panels on municipal buildings.

Assistance in resources acquisition: every year Best Duurzaam receives a budget of the municipality. Until now this budget has grown from 750 euros in 2016, 7500 euros in 2017 and for 2018 they have made an application, but it is not known yet. It has been eight weeks, and after six weeks they should have had an answer, this is something they are not happy about. According to the cooperative, this has to with public continuity. They have to deal with different people due to a change in counsel, people that are ill or are on maternity leave. In total, the municipality has a maximum of 20.000 euros available for several subsidy arrangements when it comes to social support (Subsidies Best, 2018). Next to this, budget the municipality also offers a pre-financing for solar panels, which people can pay back in fifteen years.

Assistance in coordination and implementation: the municipality sees Best Duurzaam as a full-fledged partner, but sometimes seem to forget that it is a voluntary organization. Meetings are for example planned during working hours. There is a tension for Best Duurzaam to still work and be seen as a full partner, but still, have the hours and resources of a voluntary organization. The cooperative connects the municipality with different parties. When looking at the collaboration with the municipality is works well on a higher governmental level (with council members), however, on administrative and executive level still have an old mentality. The way of working is very different the municipality makes plans, does inventory, prioritizes before anything happens. In contrast, Best Duurzaam wants to implement actions and make things happen in a short period. The municipality feels that collaboration is essential to make thing happen. Together with Best Duurzaam, they have created an implementation program which states that Best Duurzaam is responsible for convincing citizens to take up energy measures (Uitvoeringsprogramma, 2017). Next to this, there is a sounding board that consists of various citizen initiatives that focus on co2 reduction. Important is not only that initiatives helps the municipality but that the municipality thinks along with the initiatives. They also connect parties, such as school and housing corporations with Best Duurzaam to stimulate collaborations. Expediting permits or project does not happen right now, but it is something the municipality would like to focus on in the future.

Variabele	**Indicator**	*Zuiderlicht*	*Ecostroom*	*Buurtcoöperatie Oostelijk Havengebied*	*Duurzaam Soesterkwartier*	*Best Duurzaam*

Creating awareness	**Give or ask for attention on co2**	• Climate goals for 2020 & 2025 • Take on leading role • Active sustainability department • Large and slow organization • Zoncoalitie: problematic • Present during events • Communication plan with monthly sustainability theme	• Climate goals for 2020 & 2025 • Take on leading role • Active sustainability department • Large and slow organization • Zoncoalitie: problematic • Present during events • Communication plan with monthly sustainability theme • Little communication support for the districts	• Climate goals for 2020 & 2025 • Take on leading role • Active sustainability department • Large and slow organization • Present during events • Communication plan with monthly sustainability theme	• Climate goals for 2030 • Take on leading role • Collaborated with citizens and organizations to put plans on paper • Information window is missing • Started with initiating role, now more facilitating	• Climate goals for 2030 • Take on leading role • Communicating ambitions during events • Information window is missing • Information provision could be better
Assistance in resource acquisition	**Facilitating in submission of grants and funding or providing cash or in kind means**	• Subsidies for cooperatives • Stimulate growth of cooperatives	• Subsidies for cooperatives • Stimulate growth of cooperatives • Subsidy for roof owners	• Subsidies for cooperatives • Stimulate growth of cooperatives • Cooperative receives yearly budget	• Limited subsidy	• Yearly budgets • Pre-financing for solar panels • Slow and changing organization
Assistance in coordination and implementation	**Facilitating by making sure organizations work together in an effective manner and share knowledge**	• District coordinators that connect parties • Information on website • Facilitation through 02025	• District coordinators that connect parties • Information on website • Facilitation through 02025	• District coordinators that connect parties • Information on website • Facilitation through 02025 • Good and frequent contact with district teams	• Sustainability ambassadors • Civil servants very open and active • Municipal system is slow	• Close collaboration with Best Duurzaam • Best Duurzaam has more connective capacity • Sounding board of citizens
	Facilitating by expediting permits or approval for projects	-	-	-	-	-
Numerical score		**3**	**3**	**4**	**2**	**2**

Table 13: Overview concept hands-on municipal facilitation

Similarities and differences

All the municipalities in this study have set future visions and goals when it comes to co2 reduction and sustainability. Amersfoort and Best have set these goals for 2030 and Amsterdam for 2020 and 2025. Also, all the municipalities want to have a leading position in the energy transition process. To make citizens aware of this, they organize events and are present during information meetings of the cooperatives and other parties, such as 02025. Something that is missing in all the municipalities is a specific window for sustainability where people can ask their questions and have easy access to information on various forms of clean energy generation. According to Zuiderlicht, the cooperative thought of Amsterdam is difficult to be found due to the large and non-transparent organization. The sustainability department, however, is very active. Also, the zoncoalitie initiative does not work as it is supposed to for the cooperatives. Both Zuiderlicht and Ecostroom have shown their discontent. The zoncoalitie comes between the roof owners and cooperative instead of facilitating it and creates more bureaucracy.

Assistance in resource acquisition is mainly done through subsidies. Amsterdam and Best have subsidies for cooperatives or citizens that want to partake in the sustainability quest. Especially the subsidy in Amsterdam for cooperative is working well according to Zuiderlicht, partly due to the collaborative nature. Amersfoort also has a subsidy, but this is not open at the moment. An issue for Best Duurzaam is the application period, which is now longer than supposed to be. They feel that this is due to the change in counsel and people becoming ill or leaving for maternity leave at the municipality. Duurzaam Soesterkwartier deliberately does not want to be dependent on subsidies to be efficient and stay transparent. Most information on subsidies is found on the municipal websites. This information is sometimes difficult to find because it is complicated and written from a sender point of view.

Within assistance in coordination and implementation permits and projects are not expedited by municipalities, although most would like to work on this in the future and also facilitate initiatives in this way. In Amsterdam, they work with district coordinators, which are seen as very helpful when it comes to connecting parties, assisting in collaborations and networking. Also, the sustainability department is very active and open to cooperatives. In Amersfoort, sustainability ambassadors have communicated with the municipality on behalf of the citizens. Here they feel that public servants are understanding and put in the effort for the initiatives. In Best the cooperative works very closely with the municipality and is seen as a partner. Best Duurzaam feels that this collaboration works best on the board level. The administrative and executive level still have an old mentality. Through an implementation plan and a sounding board, the municipality collaborates closely with various parties. A significant difference according to most cooperatives is that they want

to work fast and efficiently and this sometimes clashes with the slow and bureaucratic nature of municipalities.

Table 13 shows overall that the cooperatives are very happy with some aspects of the municipal facilitation and other aspects could be improved. All municipalities create awareness by speaking out on future goals and showing they want to take on a leading role in the energy transition. Also, being present during events and information meetings is a strategy that is regularly deployed (Korosec & Berman, 2006). The scores (3 & 4) of Amsterdam are a little bit higher. Amsterdam offers a broad range of funding proposals, mainly in the form of subsidies (ibid). Knowledge sharing and collaboration facilitation (ibid) mostly happen through the district teams. The reason why the score of facilitation for Zuiderlicht and Ecostroom are lower is due to the zoncoalitie, which is a program that does not facilitate the cooperatives in the way it should. Amersfoort and Best both have a score of 2. For the Amersfoort municipality, this has to do with little to no subsidy possibilities and a slow municipal system that seems to facilitate more in campaign periods. The Best municipality sees Best Duurzaam as a true partner, which in some respects is good. However, they could offer more subsidy options and process the application for this more efficiently. It also seems as if Best Duurzaam mostly maintains itself instead of being genuinely facilitated by the municipality.

6.4 Municipal support rationale findings

Zuiderlicht

Increasing effectiveness and integration: according to Zuiderlicht, the municipality is aware of the fact that they need cooperatives to reach the citizens in Amsterdam. This is something that is quite difficult for the municipality. Due to the work of cooperatives, the consumer becomes more of a producer. Also, according to the municipality cooperatives help them to increase the effectiveness of their policies. This is precisely why they give subsidies for cooperatives.

Access to shared resources: this especially has to do with reaching the citizens in Amsterdam. This is difficult for them, and Zuiderlicht has close contacts here. According to the municipality, it is mostly about stimulating cohesion.

Alignment: a big question for the municipality is to see how they can activate the citizens. According to Zuiderlicht, it does not work to align citizens with their policies. This will be done through evenings where the citizens can have their say, but their influence is limited because the plans are already set. According to the municipality, they do use their collaboration with cooperatives to have a better understanding of what is going on in society. They have conversations with cooperatives to see how things are going and what they need help with. To give citizens a specific insight into municipal policy is not a goal they have.

Ecostroom

Increasing effectiveness and integration: the government is not able to reach citizens. They talk a lot about citizens but not with them. This is where the civil society is needed to do this translation and make things happen. With government, the citizens are the end part of a process, and for Ecostroom the citizen is in the center of attention. The government is starting to see that citizens are starting to play an important role. Also, the subsidy arrangements are a way that the municipality tries to reach their own goals.

Access to shared resources: this also has to do with reaching the citizen, which is not easy for municipalities and governments.

Alignment: Ecostroom thinks that the sustainability department does try to understand what is going on in society by working with cooperatives. However, other departments are not yet there. To align citizens with their policies, there are information campaigns, sustainable markets, and other actions. Also, they try to give insight to citizens on which subsidy would work best for which plan.

Buurtcoöperatie Oostelijk Havengebied

Increasing effectiveness and integration: according to the cooperative, the facilitation of initiatives is, in fact, municipal policy. They think the municipality is happy that the cooperative has taken responsibility for their neighborhood. Oostelijk Havengebied thinks that the municipality sees initiatives such as solar energy as a manner to achieve own policy. Also, the municipality sees bottom-up initiatives as a way to be more effective themselves. It is kind of half of the measure to involve citizens and make sure they become active.

Access to shared resources: This has to do with reaching citizens. In the neighborhood, the municipality looks for key figures. This could be citizens that are really active or already working on sustainability. With a group of key figures, they make a plan to involve the rest of the neighborhood.

Alignment: Oostelijk Havengebied does think that the municipality tries as a way to align citizens with their policies. However, most citizens only focus on what they want to reach and not so much on what the municipality wants. The municipality organizes various campaigns, also for sustainability. They try to give information about their arrangement and subsidies. To learn what is going on in society, the municipality tries to have various conversations with cooperatives to see what they need and how they collaborate. This is also why they have various area teams, to get external information within the organization.

Duurzaam Soesterkwartier

Increasing effectiveness and integration: the municipality of Amersfoort has explicitly come forward in mentioning that cooperatives help them with reaching their policy. They do this by mentioning this publicly and by taking it up in their policy The municipality has implemented ambassadors in society. These are citizens that are concerned with sustainability. By doing this, the municipality has made it clear that they support the ambassadors. In the past the initiative was more at the side of the municipality, nowadays they are facilitating. This also has to do with little money and resources.

Access to shared resources: the municipality sometimes asks the initiative to give a presentation or if it is able to visit them and sometimes if they participate in their energy evenings. This happens once in a while.

Alignment: according to Duurzaam Soesterkwartier the municipality tries to get knowledge from the cooperative. They also come to tell their own story. There is a difference between the regular governance process and the election time. When they are doing their campaigns, they are more open to contact with initiatives. The sustainability ambassador concepts is a way to get citizens more aligned with their policies. The ambassador gives information to stakeholders. Also, a window for environmental measures would be handy.

Best Duurzaam

Increasing effectiveness and integration: this is done by working closely with initiatives such as Best Duurzaam. The cooperative is in charge of activities for citizens, and the municipality focuses more on organizations. Best Duurzaam has the impression that the municipality needs them more to have contact with citizens than the cooperative needs the municipality for contact with organizations. The municipality also sees the form of collaboration as a way to increase their effectiveness and integration.

Access to shared resources: according to the municipality the cooperative has a good network. The municipality notices that citizens are suspicious about the municipality. When a fellow resident says that something is good, people will look at it less distrusting then when an organization or municipality says the same thing.

Alignment: the municipality is present during the meetings of Best Duurzaam to hear if there are questions from citizens. They emphasize that they do not only want to tell their own story but to be there to answer questions. This helps the municipality to find out what is going on in society. By being present during these meetings and presenting their plans, they also try to align citizens with their policies. To tell citizens where they can go with questions or problems.

Variabele	**Indicator**	*Zuiderlicht*	*Ecostroom*	*Buurtcoöperatie Oostelijk*	*Duurzaam Soesterkwartier*	*Best Duurzaam*

				Havengebied		
Increasing effectiveness and integration	**Expectation that bottom-up initiatives increase effectiveness and integration**	•Need for collaboration is known •Reason for subsidies	• Civil society needed to make things happen • Government is acknowledging role of citizens	• Facilitation is municipal policy • More effective through collaboration	• Cooperatives contribute in reaching own policies • Taking on facilitating role	• Working closely with cooperatives • Collaboration seen as way to increase effectiveness
Access to shared resources	**Join forces and have access to shared resources, such as knowledge, leadership and skills**	•Reaching citizens	• Reaching citizens	• Reaching citizens	• Ask initiative for presentation or to participate in events	• Coming in contact with citizens
Alignment	**Municipalities understanding what is going on in society**	• Through collaboration with cooperatives	• Mainly done by sustainability department	• Through various conversations with cooperatives	• Get knowledge from initiatives • During election campaigns more open for contact	• Listen to citizens and answer questions
	Citizens get more aligned with municipal policies	• Not a specific goal	• Through information campaigns	• Municipality wants to align citizens	• Align citizens through sustainability ambassadors	• Presenting own plans and ideas
Numerical score		**4**	**4**	**4**	**4**	**4**

Table 14: Overview concept municipal support rationale

Similarities and differences

Municipal support rationale is mostly seen in the same way in the three municipalities.

The municipalities as the initiatives are aware of the fact that to achieve municipal goals in collaboration with cooperatives is needed. This is also the main reason for the provision of subsidies. According to Ecostroom municipalities have a difficult time to reach citizens. The municipality talks about citizens but not with them.

Furthermore, working with cooperatives helps municipalities to come in contact with citizens. Citizens are sometimes suspicious of government and are more trusting towards their neighbors. In neighborhoods, municipalities work with key figures to achieve this goal. Nowadays municipalities are taking on a more facilitating role.

Finally, when it comes to alignment, municipalities try to learn what is going on in communities through cooperatives, especially the sustainability departments. This a primary reason why Amsterdam works with district teams, to get external information into the internal organization. Mostly to align citizens with their policies is not a specific goal, but they do try to

inform them on what subsidy options there are for example, and they try to answer questions during member meetings or events. However, according to Oostelijk Havengebied citizens particularly focus on their own interests and not so much on what the municipality wants to achieve. According to Duurzaam Soesterkwartier, there is a difference in alignment during regular governance periods and election time. In this municipality, they work on the alignment via the sustainability ambassadors.

Table 14 shows that the municipalities have very similar support reasons. They see the cooperatives as ways to also reach their own goals and increase their effectiveness (Korosec & Berman, 2006). Collaborations with cooperatives are also a way to reach citizens, which is something that is typically difficult for municipalities. And the alignment is mostly about getting external societal information into the organization to have a better understanding of what is going on in their cities. As the municipalities do not show significant differences in their support rationale, they all have received the same scores of 4. The score of four is due to little focus on shared resources and alignment of citizens with own policy. However, it should be mentioned that a rationale can differ per organization and the theory does not state a perfect support rationale.

6.5 Integral analysis

The integral analysis will consist out of three parts, which are related to the relationships shown in figure 2. This part will compile and analyze the factors discussed in the theory and the interviews. These factors are by no means completely inclusive and the only aspects a bottom-up initiative of municipality should take into account. This paragraph summarizes the main findings and tries to present the relationships found between the independent and dependent variables.

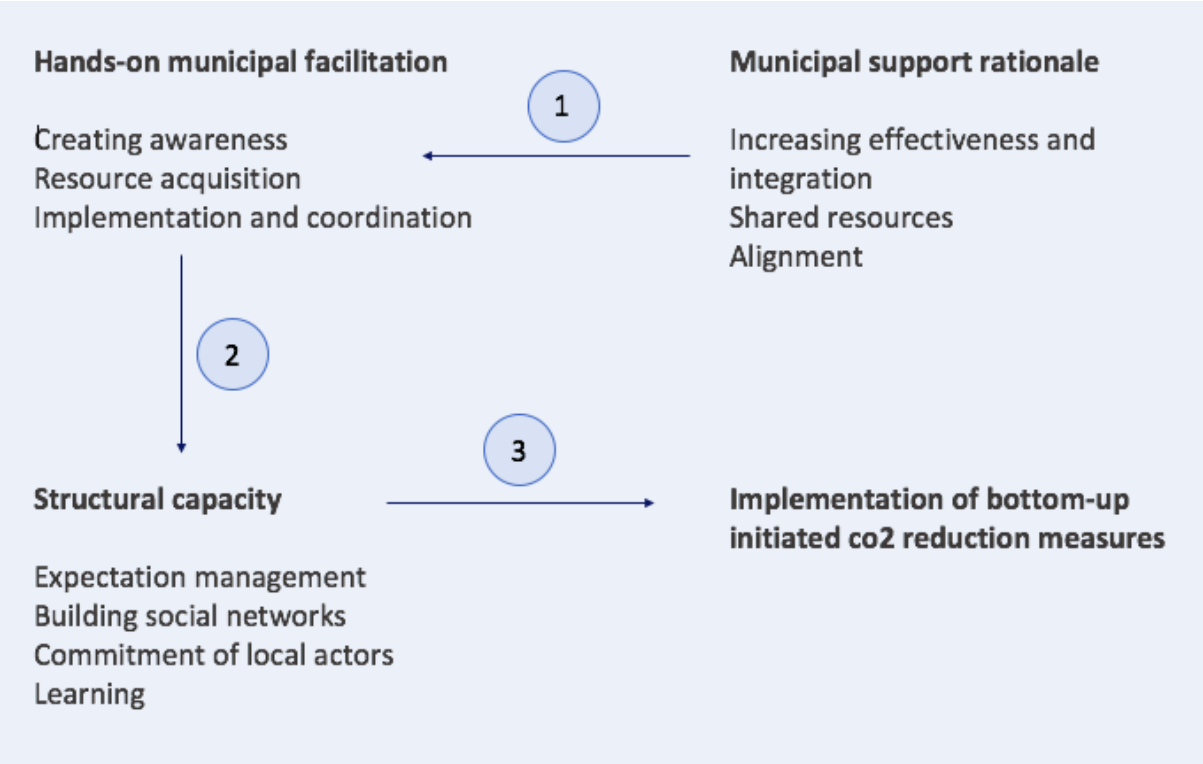

Figure 2: relationships conceptual model

Municipal support rationale and municipal facilitation (1)

First, the relationship between the municipal support rationale and municipal facilitation. As the theory states, the rationale behind this support could vary. As elaborated in the theoretical framework there are several reasons for municipalities to support bottom-up initiatives (Korosec & Berman, 2006). These include increasing effectiveness and integration, access to resources, and creating alignment (Edelenbos & Van Meerkerk, 2016; Korosec & Berman, 2006). Factors that have shown to influence the facilitation of the municipalities in this study are increasing effectiveness and integration, access to shared resources, and alignment.

An important rationale for municipalities to facilitate bottom-up initiatives is due to the recognition that they need the cooperatives to reach their own goals timely and effectively. There is an awareness that active participation in the civil society is crucial for the energy transition. Theory adds that the involvement and participation of citizens is needed to implement environmental policies, because of the decentralization of the energy system and energy self-sufficiency (Kalkbrenner & Roosen, 2015). For the Amsterdam municipality, it is very clear that the cooperatives and the public servants see the importance of this factor. During the interviews with Zuiderlicht, Ecostroom, and Oostelijk Havengebied it came to light that increasing the effectiveness of their own sustainability goals through facilitation of the cooperatives is admitted in their policies and is the main reason to give subsidies and support to the initiatives. In Amersfoort also the municipality

speaks publicly on the matter and is changing from an initiating role to facilitation. In Best the municipality sees the added value of the cooperative and lets Best Duurzaam be in charge of the activities for citizens.

Sharing resources mainly seems to have an influence when it comes to reaching citizens. Municipalities facilitate in order for cooperatives to translate between the citizens and the municipality. Especially in Amsterdam and Best, this was the case. During the interviews, it was stated that reaching citizens through cooperatives is done because many citizens might trust their neighbors more than they do the government. Also, the cooperatives are in close contact with citizens, which causes them to have a better view of the needs and wishes of a community. This is why some municipalities have sounding boards or make use of ambassadors, to get external information in the internal organization. Where in the past the municipality might have taken an initiating role, they are now facilitating these initiatives to have outcomes that also benefit their own goals and policies. In Amersfoort, the sharing of resources happens through knowledge and network sharing. The municipality asks the initiative to give presentations on their sustainability expertise and projects. Furthermore, the municipality sometimes asks to be present during sustainability meetings. Theory furthermore states, that by acknowledging interdependencies municipalities can join forces and have access to shared resources, such as knowledge, leadership, skills (Edelenbos & Van Meerkerk, 2016; Korosec & Berman, 2006). Leadership and skills did not come up in this study.

The last factor in this concept, which also has shown an influence on facilitation is alignment. Alignment can have two sides: aligning citizens with municipal policy so that they have a better understanding of this and alignment in the form of getting an understanding of what is going on in society (Edelenbos & Van Meerkerk, 2016). This study shows that alignment is very closely connected to access to shared resources. Aligning citizens with their policies is seen as a secondary objective and is done through online and face to face information provision. Both aligning citizens with municipal policy and alignment to get a better understanding of what happens in society are linked to citizens and the relationship with them. Through collaborative governance, citizens get to know and become more aligned with municipalities and their policies. This also works for local authorities as they will get a better understanding of what is going on in society and what issues are essential for them to focus on (ibid). Mainly to get the knowledge and have an understanding of what is going on in society is essential. Municipalities try to reach this goal by working with the cooperatives and being present during information meetings and sustainability events. They try to listen to the questions and concerns of citizens. Also, the Amsterdam municipality seeks to create alignment by organizing its own information events and sustainability markets. In Amersfoort, they try to create alignment through sustainability ambassadors, which again correlates with the factor of

sharing resources. According to Duurzaam Soesterkwartier, they sense a difference in municipal interest during election periods. In Best, the cooperative takes the lead in organizing information events, and the municipality is present to give information and ask questions.

Hands-on municipal facilitation and structural capacity (2)

Second, the relationship between municipal facilitation and structural capacity. This study has aimed to show in what way municipal support influences the internal processes (structural capacity) of bottom-up initiatives. As theory states, these initiatives are addressing social issues in their communities and when doing so municipal support is important for the future of these initiatives as it can boost their development (Duijn et al., n.d.). The theory states that an enabling and facilitative leadership style is important. This means that there is direct contact between municipal actors with bottom-up initiative members (Sorensen, 2006). Municipal managers can support bottom-up initiatives by creating awareness, assisting in acquiring resources, and assisting in coordination and implementation. Hands-on municipal facilitation factors that have shown an influence on the structural capacity of bottom-up initiatives are creating awareness by speaking out on co2 reduction, giving funding, and direct collaboration and coordination.

In this study, it is shown that municipalities support bottom-up initiatives by increasing community awareness of the co2 reduction issue (Korosec & Berman, 2006). All three municipalities have set future sustainability goals. Amsterdam, Amersfoort, and Best all want to have a leading role in the energy transition. Amsterdam wants this in electric transport and natural gas, Amersfoort has set this goal in a broader spectrum and wants to lead in wind, solar, and other energy sources, and Best wants to be the first energy neutral region of the Netherlands in collaboration with the Metropol area Eindhoven. Next, to setting goals and leadership, municipal managers speak out on relevant subjects and participate in events. As theory states, this gives some form of legitimacy and interest in the work of the cooperatives (ibid). The municipal departments and managers organize and are present at public sustainability events and cooperative meetings. In Amsterdam, various campaigns are created for the use of solar energy or the transition from gas. There is a communication department that is responsible for this. However, they lack resources. In Best, the municipality is often present during member meetings of the cooperative to show their face. In the case of Amersfoort, the municipality also had an initiating role, in the beginning, to educate people on the need for cooperatives or associations Korosec & Berman, 2006). After this, they have taken on a facilitative role. An issue many cooperatives and citizens run into with the municipality when it comes to awareness creation is the large and non-transparent organization. This makes it difficult for citizens to find the right people and information within the municipality. This information is mostly

created from a sending point of view, which does not help. Also, when municipalities take over control and start their own initiatives, such as the zoncoalitie in Amsterdam, it can be seen as negative by the cooperatives. Departments and public servants that work closely with the cooperatives do seem more active and seem to have a better reputation.

Furthermore, municipalities can assist bottom-up initiatives through the acquisition of resources. In this study, this factor mainly seemed to have an influence through the submission of grants and funding proposals (Korosec & Berman, 2006). This assistance is mainly done through subsidies and helps the cooperatives to run their organizational processes. The Amsterdam municipality seems to have various forms of subsidy available for cooperatives and citizens. One of the subsidies was created in collaboration with cooperatives and this was very much appreciated. An issue with this is the knowledge people need to have to find the right information. One must look for the subsidy information themselves and this is hard to find. The Amersfoort municipality does not seem to have solid funding options and does not actively involve the cooperative in this and the Best municipality gives a yearly budget, which seems to rise, however they are not on time with looking into the application for funding of the cooperative this year. In-kind means are closely connected with the factors creating awareness and implementation and coordination and will be explained in these paragraphs.

Lastly, municipalities can make certain organizations work together effectively and share knowledge and information to boost the development of bottom-up initiatives. Also, they can help in ways that make implementation of measures easier by expediting permitting or approval for a project (Korosec & Berman, 2006). In this study the three municipalities facilitate directly through collaboration with district coordinators, sustainability ambassadors, partnering up with cooperatives and cooperatives, which contributes to the structural capacity of the cooperatives. The Amsterdam municipality works with district coordinators that have a broad network per city district. The coordinators try to get an understanding of the community, they inform, and try to connect parties. However, for subsidies, the cooperatives need to contact the central government in Amsterdam. 02025 is an organization that organizes sustainability events where stakeholders come together and discuss new technologies and happenings within the sector. The Amsterdam municipality lets this party be responsible to facilitate collaborations and create a sustainability network among stakeholders as they feel 02025 is better at this. Amersfoort works with sustainability ambassadors, which are social actors that get information from the community and communicate this to the municipality. In Best the cooperative is seen as a full partner and they take on the responsibility for contact and collaboration with citizens. Also, there is a sounding board consisting out of citizens. The municipalities do not expedite permits or projects yet, although they all mentioned that this is a goal

for the future, according to Duurzaam Soesterkwartier this is due to the slow municipal system. A tension that arises here is the difference between cooperatives and municipalities. Cooperatives work fast and efficiently, and this sometimes clashes with the slow and bureaucratic nature of municipalities, which causes the organizational processes of cooperatives also to slow down.

Structural capacity and the implementation of co2 reduction measures (3)

Finally, the relations among structural capacity and the implementation of co2 reduction measures. To achieve successful implementation by reaching local goals and achieving positive effects (Matland, 1995), there are various organizational factors (structural capacity) that have an influence. As mentioned in chapter three successful implementation relates to loyalty to prescribed goals or reaching positive effects within a community (Evers, 2001; Walker 2009). In this study successful implementation of bottom-up co2 reduction measures refers to cooperatives that focus on solar projects

In order to complete these projects, they work with subsidies, arrangements and offer membership to citizens to become part of the cooperative for a small amount per year. Positive effects are based on creating awareness on sustainability and enlarging the social network. The cooperatives vary from professional to voluntary organizational forms. And there can be made a difference between hard (economic) and soft (social) goals. Main differences in cooperatives are that Zuiderlicht and Ecostroom are professionalized and have specified hard and soft goals. Also, they already realized quite a few solar projects. The other cooperatives have fewer projects and more focus on social goals and these goals are less specifically formulated. In this study, the factors shared future vision, internal and external social networks, and commitment of local actors have shown to have an influence on the successful implementation of the co2 reduction measures.

Managing expectations is about joint image building and transformational leadership, which is achieved when actors have a better an understanding of the problem and are inspired to take action (Klijn & Koppenjan, 2016; Bass & Riggio, 2006). This shared understanding is very closely connected to the concept of implementation as it manifests itself in the form of social and economic goals, such as placing a certain amount of solar panels or creating awareness. For Zuiderlicht and Ecostroom, this future vision was created through joint image building within the organization with the board and employees. External members and organizations were not included in this. For Oostelijk Havengebied this is the same. However, they have the intention to change this in the future and include their members in the creation of their future vision. Soesterkwartier members are mainly included in the projects and are allowed to come up with own ideas. Best Duurzaam is also mainly focused on joint image building within their own board. This study shows that there is a

shared future vision within the board of the cooperatives but it does not yet go much beyond this. Real joint image building with all involved stakeholders does not yet happen. The cooperatives do try to stick to the promises they make in their future vision. Especially Ecostroom has concretely mentioned they want to be truthful, stick to their promises, and be profitable. Almost all cooperatives do show an intention to include members and other parties more in their organizational processes in the future. Scientific research does not seem to have an influence on successful implementation. It is something that might be helpful for the initiatives, but due to time and costs, it is not part of the main activities.

Building social networks is vital for bottom-up initiatives so they can expand by involving new actors in the participation process and be more successful in their implementation. To do this correctly, the network needs to be inclusive and fair to all stakeholders. It is essential that third parties, who are not directly involved in the network, are still able to contribute to ideas (Kemp, 1998; Klijn & Koppenjan, 2016). This factor is very closely connected to expectation management, which is also about creating a shared and inclusive understanding. As the cooperatives do not have a complete inclusive future vision and do not work according to the joint image building theory, building social networks seems to be a very important influential factor. The initiatives are a center point in society and are essentially a link between society and local government. As well as their internal as their external processes seem to be deliberative and inclusive in this study (Klijn & Koppenjan, 2016). Even though, as elaborated for expectation management the internal process might be a bit more deliberative. The cooperatives all try to involve third parties (ibid), such as their members and other parties through member meetings, attendance at events, collaborations with cooperatives or municipalities and creating working groups. The cooperatives share knowledge internally with their members. Externally they work with several parties such as energy suppliers, municipalities, 02025, Hieropgewekt, and other cooperatives. Especially Oostelijk Havengebied, Soesterkwartier, and Best Duurzaam have a big focus on a close network with the neighborhood and community. For Best Duurzaam this is even broader and includes other cooperatives, the municipality, and the Metropol area Eindhoven. For the larger project corporations, networking is important to find new projects and roofs to place solar panels on. Zuiderlicht tries to involve people within their projects, such as schools, children, and their parents. Also, they think a good network is important to deal with bureaucratic processes. Ecostroom is present during various sustainability events to broaden their network, find new projects, and have people talk positively about them. They seem to function more as organizations and completion of projects appear to be more important than local networks.

The commitment of local actors is already mentioned in theory to be a crucial factor, as the cooperatives cannot function without the commitment of the board, employees, and members. This commitment can cause organizational development, which is the evolvement of a bottom-up initiative from an ad-hoc working group to a more formal organizational type. For the development, the sustainability of participation is important and this can be motivated by an enabling management style that is aimed at creating strong relationships and trust (Van Der Schoor & Scholtens, 2014). Actors need to be given responsibility and freedom (Klijn & Koppenjan, 2016). Also, the level of activities is seen as an indicator of a high commitment of involved actors. This indicator is about the spectrum of activities bottom-up initiatives initiate, such as education, information, funding, and social media activities (Van Der Schoor & Scholtens, 2014). In this study, the commitment of local actors has shown to have an important influence on successful implementation. All cooperatives, in one way or another, try to professionalize. Zuiderlicht and Ecostroom focus on professionalization by managing organizational processes more formally or using CRM systems. For the other cooperatives, professionalization is about being able to put in more hours and start creating more economic goals. For all initiatives the members are given freedom and responsibility to take the initiative in the form of ideas for actions, attending events and making contacts or a network. This can be seen as inherent to bottom-up initiatives as they originate from an ad-hoc organizational style where citizens with a certain future vision take matters into their own hands (Van Der Schoor & Scholtens, 2014; Kalkbrenner & Roosen, 2015). This freedom is important to find new projects and come up with new ideas for implementation. Intrinsic motivation mainly has to do with a better future for the youth, being green and sustainable on a local scale, preserving the ecosystem, the fear of what the future holds, and the urgency of the energy transition. To start up a cooperative and implement co2 reduction measures, idealistic motivations seem importan. It is also shown that the project cooperatives are putting in more hours per week to keep their organizational processes going and implement their projects compared to the other cooperatives. This has to do with the fact that the other cooperatives function on a voluntary basis and that the project cooperatives have realized more projects.

Learning on network level is a reflection on values, strategies, assumptions, and policies that drive activities and these are changed through learning and a joint outcome and co-production of policies and services (Loorbach, 2007; Provan & Milward, 1999). This type of learning does not seem like a crucial factor for successful implementation. It happens on an informal basis with the cooperatives and the municipalities. When reflecting with the municipality, it is mainly about showing how subsidies and budgets were spent. This factor could again be connected to building social networks, as for networks knowledge sharing is an important aspect.

7. Conclusions and recommendations

7.1 Conclusions

In a time where the government is taking a step back, the citizens take over and try to deal with social issues through bottom-up initiatives. As there is little research conducted on the implementation of energy and climate policies, the aim of this study is to create a better understanding of best practices in the field of bottom-up initiatives that implement co2 measures. In order to reach this better understanding, the main research question will be answered in this chapter: *which factors are of influence on the implementation of bottom-up initiated co2 measures?*. This research argues a few main conclusions based on the concepts that have been measured and the factors that have shown to have the most influence on the successful implementation of bottom-up initiated co2 reduction measures.

The first conclusion of this study is that the municipalities in this research have similar rationales to facilitate bottom-up initiatives. For Amsterdam, Amersfoort, and Best increasing effectiveness and shared resources are key factors to support the cooperatives. This municipal support is crucial for the future and development of the cooperatives so that they can keep addressing social issues in their communities (Kalkbrenner & Roosen, 2015). The municipalities are aware of the fact that active participation and the activities of bottom-up initiatives are important for municipal co2 reduction goals. Theory elaborates on this by stating that these initiatives create innovation, experimentation, and are cost-effective. The involvement of and participation of citizen is needed to implement environmental policy, due to the decentralization of the energy system and it avoids opposition and implementation issues (ibid). Furthermore, facilitating these initiatives could be seen as a municipal strategy to implement new climate policies due to the lack of full implementation capacity and the interdependence with other parties (Khan, 2013). This research has shown that this awareness is admitted in municipal policies, and it is the main reason municipalities make subsidies available. Also, the ability to make use of shared resources has shown to influence municipal facilitation. Resources that the municipalities have interest in is the ability to reach the citizens. For most municipalities this is difficult, and cooperatives have proven to be excellent parties for this due to their extensive social network and their more trustworthy image in society. Citizens want to have reliable local energy and start to rely on their community instead of governments (Elzenga & Schwencke, 2015). Alignment has also shown to have some influence on municipal facilitation for bottom-up initiatives. This alignment is mainly about having an understanding of what is going on in society, which again refers to the ability to reach the citizens.

Municipalities try to reach this goal by being present during information meetings of the cooperatives and sustainability events. They try to listen to the questions and concerns of citizens.

The second conclusion is that hands-on municipal facilitation is essential by creating awareness and facilitating in funding. The changing role of authorities in the process of democratic governance asks for a change of managing strategies. As Sorensen states, governance should be managed through various forms of meta-governance. Through taking a more hands-on enabling stance, municipalities offer support and facilitation to bottom-up initiatives and support and promotes their actions (Sorensen, 2006). When municipalities speak out on the subject of co2 reduction, it provides legitimacy and interest for the actions of the initiatives (Korosec & Berman, 2006). The legitimacy and interest can mean that the actions of cooperatives are taken more serious by citizens and other organizations. This, in turn, can have a positive effect on the processes of initiatives and can help them to implement their projects. Municipalities in this study have spoken out on co2 reduction by creating future goals, organizing and being present during public sustainability events, and cooperative member meetings, which gives support and authority to the initiatives. This study has shown that some information that is given through the creation of awareness is based on a sender point of view, which was especially the case in Amsterdam but also shown in the other municipalities. This makes this information difficult for receivers to understand. Important here is clear and transparent information provision. Another factor that shows to influence awareness creation is that cooperatives want to be involved in the creation of co2 reduction plans, especially plans that influence them directly. The zoncoalitie in Amsterdam is an excellent example of this. There has been some dissatisfaction from cooperatives because it was not a deliberative and successful process to them. For the cooperatives, it is important that these kinds of initiatives support or unburden them and help them to find new roofs in order to implement new projects. Funding is the second crucial factor for the successful implementation of co2 reduction measures by cooperatives. Funding is one of the most critical ways in which municipalities can support bottom-up initiatives. This helps the initiatives to invest in projects and to develop their organizational processes (structural capacity) (ibid). It makes sure the cooperatives can, for example, make their internal processes run smoother and market themselves better. The municipalities in this study assist especially through subsidies. Again here, cooperatives like to be included in the creation of the subsidy and want their needs and wishes to be taken into account. Important is that municipalities show efficiency in the approval of funds and do not let the cooperatives wait too long due to slow and bureaucratic processes. Inertia and bureaucracy have been shown to be an overall issue for the collaboration between municipalities and bottom-up initiatives. For facilitation in funding, a difference can be found between the large municipality and the two smaller ones.

Amsterdam offers more funding options in the form of subsidies. In Amersfoort and Best, the financial options are smaller. In this study, the effect this could have is the number of projects that are implemented by cooperatives, in the Amsterdam cases this is higher. However, this could also be the case due to the two large project cooperatives that were part of the Amsterdam cases. In sum, creating awareness and offering to fund through an inclusive, deliberative and effective manner are key factors that influence and enhance the structural capacity of bottom-up initiatives.

As the structural capacity is about the development and network of a bottom-up initiative (Sharpe, 2005). Successful implementation is about loyalty to the prescribed goals or reaching positive effects within the community (Matland, 1995; Evers, 2001). The third and final conclusion is that a shared understanding in the form of social and economic goals, development through professionalization, building social networks, and idealistic motivations are essential factors that influence the successful implementation of co2 reduction measures by bottom-up initiatives. Within the theory, expectation management refers to a shared vision of the future, which is based on a shared definition of sustainability (Loorbach, 2007). Within this study, this shared understanding manifests itself in the form of social and economic goals. Social goals are important for creating awareness and a shared vision, which is also supported by the community. Economic goals help cooperatives to have future entrepreneurial ambitions. The economic goals are also important for the growth and professionalization of the bottom-up initiatives. A primary difference found between the cases is that the project cooperatives have both social and economic goals. They have a social focus on sustainability but also an economic one about growing and implementing more projects in the future. The voluntary based initiatives have only social goals and Duurzaam Soesterkwartier does not have an own vision. It also seems that the voluntary cooperatives have less clear and specific goals formulated compared to the project cooperatives. Interesting to see is that the project cooperatives have many more solar projects implemented. Connected to this is the professional development of the initiatives. This refers to the organizational development of an initiative from ad-hoc to a more formal organizational form (Van Der Schoor & Scholtens, 2014). This study shows that project cooperatives focus on this professionalization by managing organizational processes more formally or using CRM systems. For the other cooperatives, professionalization is about being able to put in more hours, growing, and creating more economic goals. The main difference here is that it seems that the project cooperatives are focusing on more efficiency and the non-project cooperatives are still in a more developing phase of their core business. This can also be seen in the achievement of local goals (successful implementation) that the project cooperatives have, such as doubling in projects and creating clean energy for the lowest possible price. Social networks are created through interaction with members and the municipality to see what the needs are and

implement this in their goals and activities. This is important for bottom-up initiatives so they can expand by involving new actors in the participation process and to acknowledge their interdependencies (Scharpf, 1978; Bevir, 2009). Especially the three non-project cooperatives have a close external network with the neighborhood. As for the social goals, such as creating awareness, are a central focal point for successful implementation, it is important to maintain social networks. This also causes them to be a central point in their community, especially for Best Duurzaam this is the case. Another reason that a broad network is essential for the non-project cooperatives is that they rely on their volunteers for the realization of their goals and projects. For the project corporations, external networking is essential to find new projects and roofs to place solar panels. All cooperatives try to involve their members and other parties through member meetings, attendance at events, collaborations with cooperatives or municipalities, and creating working groups. Knowledge sharing is a form of building social networks and is done with members. Externally they work with parties such as energy suppliers, municipalities, 02025, Hieropgewekt, and other cooperatives. Intrinsic motivations are very similar for the cooperatives and are about a better future for the youth, being green and sustainable on a local scale, preserving the ecosystem, the fear of what the future holds, and the urgency of the energy transition. So, when a bottom-up initiative has the following structural capacities; a shared understanding of co2 reduction, professional development, secure social networks, and idealistic motivations it can lead to the successful realization of co2 measures in the form of solar energy.

7.2 Practical recommendations

Practical recommendations for this study are ways in which bottom-up initiatives can manage their structural capacity and municipalities can facilitate when it comes to co2 reduction measures. First, how bottom-up initiatives can manage their structural capacity. This study has shown that having a future vision that has a social and economic focus is key. The social focus is essentially part of bottom-up initiatives that want to implement co2 reduction measures. Most of these organizations start from a local sustainability perspective, in which they want to create a better and green future together with the community they are surrounded with. However, this study has shown that an economic goal is also crucial in order to grow as an organization and to reach goals. It is good for bottom-up initiatives to compose economic goals or visions, such as doubling in projects next year, implementing a certain amount of solar panels per year or generating this amount of solar energy in a certain timespan. These goals are intimately connected to professionalization. For bottom-up initiatives, it is important to grow, especially in the starting phase. When they grow, a few aspects need to be taken into account, such as managing the member growth, managing internal processes, managing internal and external communication and managing networks. To oversee this, it is

important to professionalize by for example putting in more hours, training more volunteers, using CRM or bookkeeping systems or organizing frequent member meetings. Also, have a broad social network that is inclusive and deliberative is a crucial factor to create a strong structural capacity. Initiatives can create this by including members in the development of the vision or plans, during member meetings or organizing themed social events such as drinks or dinners. Not only is the inclusion of members important, but also parties such as the municipality, energy companies, housing corporations and networking companies should be part of the external network of the initiatives. These parties can be involved through inviting them to member meetings and by being present during sustainability events or meetings that are organized by the municipality or local networks.

Second, the municipal facilitation of bottom-up initiatives. This study shows that the municipality needs to show that they are aware of the co2 reduction issue and are speaking on it publicly. This can be done by making a future vision with concrete goals and a timeline. Furthermore, the municipalities can show their support by being present during member meetings of the initiatives, during sustainability and network events and maybe they can even take the lead and organize events and invite all stakeholders. Inclusiveness is a significant factor when it comes to municipal facilitation. Bottom-up initiatives need to feel involved in municipal plans that concern them. When municipalities deviate from this and initiate support programs or plans on their own, it mostly has an opposite effect and creates dissatisfaction. The bottom-up initiatives want to be involved when for example creating a specific subsidy for them or a network for roofs. This can be done by inviting them to discuss and collaborate on these manners personally. To be fully effective and get most out of it, municipalities can start to approach the energy initiatives are partners. Truly see them as parties that can help with the energy transition, share this responsibility and divide tasks where the initiatives focus on reaching and activating the citizens. Finally, when working with bottom-up initiatives municipalities need to realize that these are organizations that work differently. Compared to the municipality they work more ad-hoc and rapidly. A big issue for these initiatives is the nontransparent, slow and bureaucratic nature of the municipality. This might be hard to change, due to the nature of municipalities, but by including stakeholders in the plans and visions, this issue can partly be solved.

7.3 Scientific recommendations

Scientific recommendations are based on theoretical contributions and future research. Theories that have been used for this study are on policy implementation, transition management, and network governance. During this study one theory or model on bottom-up initiatives, energy transition and policy implementation was not found. A combination of theories mentioned earlier

has been made to create a conceptual model specifically for this study. Especially in the policy implementation literature, there has not been made a connection with governance networks theories and the changing role of citizens. Hopefully, this study made a small contribution to this. A start has been made with the niche management theory, for which key factors are expectation management, building social networks and learning (Kemp et al., 1998). This theory has been expended with concepts from the governance literature, such as shared vision creation, inclusiveness, the commitment of local actors, joint image building and consensus build on shared knowledge (Klijn & Koppenjan, 2016). These factors were all combined under the notion of structural capacity. Next to this concept, two other concepts have been used; municipal facilitation and municipal support rationale. Interesting to see is that the transition management literature has many similarities with the governance theory and that the results of this study can confirm many of the arguments made in the various theories, such as the importance of shared vision creation (Kemp et al., 1998; Klijn & Koppenjan, 2016), building social networks (Hanf & Scharpf, 1978; Bevir, 2010; Kemp et al., 1998; Klijn & Koppenjan, 2016) and municipal facilitation (Van Der Schoor & Scholtens, 2014). These theories have a broad explanation and are not explicitly focused on co2 reduction. This study has made the connection between these various theories and bottom-up initiatives that focus on co2 reduction and has given some practical advice.

As this study was exploratory, it has shown that many of the concepts are very broad and complex. This makes them hard to measure. Most of these concepts, such as social capital, building networks, facilitation and expectation management could be the focal point of several successive studies to get a better and more in-depth understanding of these factors. Not only qualitative but also quantitative studies could show this. Qualitative studies can show this in-depth understanding, and quantitative studies can be used to analyze a large group of cooperatives and show a more generalized image on the concepts and the relationships between them. Furthermore, in following studies the shortcomings, as explained in the methodological chapter, need to be taking into account, especially with regards to the operationalization of social capital.

7.4 Reflections

During this study a few learning point have become evident. First, because the study is explanatory and measures theoretical concepts in social life with data gathering, qualitative methods are used in the form of a multiple case study research and content analysis. Case study research is a conventional method in social science to have a better understanding of complex social phenomena (Yin, 2014). The research question, theoretical concepts, and relationships are quite complex, which makes it hard to research this via a quantitative study. Case study research gives in-depth and varied information (Neuman, 2013). It examines the details of a case's internal features, which is taken into

account in this research as the structural capacity and it looks at the surrounding situation, in this case, the relationship with the municipality (ibid). As the concepts in this research are complex, multi-factor and quite abstract, this method helps to identify the concepts and extend them. Case studies can make the details of social processes, in this case of cooperative implementing co-2 reduction measure, visible and show relations. This type of research also gives the opportunity to show multiple perspectives the study matter (Neuman, 2013). As these qualitative methods do give a rich and contextualized explanation of the concepts, this is only in reference to the cases that have been analyzed during this study. In order to have a broader and more general view on bottom-up initiatives that implement co2 reduction measures, quantitative methods could have been used. Mixed methods of qualitative and quantitative analysis would have given the in-depth understanding but also insights for generalizability. The diverse data from both the qualitative and quantitative methods could have given a better understanding of the concepts (Polit & Beck, 2010). However, due to the time and scope applying mixed methods was not possible. There was no extra time to conduct a survey, and the low response rates also made this difficult (Hayas, 2018).

Second, as already mentioned in the recommendations, many of the concepts in this study are very broad and complex. This makes them hard to measure. This study consists of the concepts of successful implementation, structural capacity, municipal facilitation and municipal support rationale. These are quite broad and complex concepts and can be divided into many variables and indicators for research purposes. During the analysis, it became clear that some variables in the study could be researched more elaborately. An example is the variable of trust (within social capital). Trust is a comprehensive and complex concept and is difficult to measure, especially when doing so through one variable or interview question. As trust was not something that seemed to have an influence during this study, it is difficult to say it this is indeed the case or if the concept needed to be measured more elaborately. Also, learning did not seem to have an influence, but it might have if the study would have been focused on it more. A different way of dealing with this was to focus this study on just one of the concepts, or even one of the variables. For this study, this would mean that it would have a more specific focus for example on trust. The concept would have been researched and analyzed more specifically, and it would have changed the focus of the study. However, as this study is explorative and tries to give more insight on bottom-up implementation of co2 reduction measures, it is not strange it leaves some open ends. Most of these concepts, such as trust, learning, building networks, facilitation, and expectation management could be the focal point of several successive studies to get a better and more in-depth understanding of these factors. Not only qualitative but also quantitative studies could be used for this (Hayas, 2018).

And finally, the organizations that participated in this study have given valuable insights. Especially as the response rate for the interviews was quite low. Many cooperatives have been approached and five were willing to be part of this study. What would have been beneficial for this study was to have more cooperatives to choose from. Especially as there was a focus on organizational type and implementation of projects for comparison. Not all cases in this study have already implemented as many projects and were very varying in their organizational phase. This does give very interesting insights, however, it would also been very useful to make use of more cooperatives that have implemented more projects. Also, not all cooperatives were in really close contact with the municipality, which sometimes made it difficult to sketch their relationship. It would have been nice to be able to have a choice between more initiatives, also for the comparison. And as mentioned before, more interviews and surveys would have given a richer insight. However, for the time and scope of this study, it has provided relevant information and conclusions.

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Appendix

Appendix 1: Operational model & interview questions

Concept	Variable	Indicator	Questions
Implementation of bottom-up co2 reduction measures	Micro level	Development of own plans and implementing these.	• What kind of co2 reduction plans are developed and implemented by the initiative?
		Implementation is successful when local goals are achieved or at least have a positive effect on the local community in the form of social trust.	• Which local goals are successfully achieved by implementation of co2 reduction plans. • In what way do these plans have a positive effect on trust in the community? (people in community are willing to act in each other's interests)
Structural capacity of bottom-up initiative	Planning and development capacity: expectation management	Shared future vision based on a shared definition of sustainability.	• What kind of shared sustainability vision is there for the future? • How has this vision been developed?
		Joint image building through interaction and authoritative (scientific) research.	• In what extent is the problem definition and vision developed on a participatory basis? • How has there been made use of (scientific) research in the implementation process?
	Relationship and network capacity: building social networks	Inclusive and deliberative process while sharing knowledge and exploring solutions.	• How was the inclusion of actors managed in this network (internal and external)? • How was knowledge shared when exploring solutions for the problem (internal and external)?
	Relationship and network capacity: commitment of local actors	Development of bottom-up initiative from ad-hoc to more formal through activities of members.	• How many members are active? • How much time are members willing to put in the activities?

		Members are driven by intrinsic motivations and are given responsibility and freedom	• What intrinsic motivators drive the members? • In what extent are members given responsibility and freedom when performing tasks?
	Planning and development capacity: learning	Social learning through reflection on perception, strategies and solutions.	• What kind of reflection and change has there been in thought and action of involved actors?
Hands-on municipal facilitation	Creating awareness	Give or ask for attention on co2 reduction measures.	• In which way has the municipality publicly spoken out on the issue?
	Assistance in resource acquisition	Facilitating in submission of grants and funding or providing cash or in kind means.	• In which way has the municipality shown support by helping to get funding and/or in kind means?
	Assistance in coordination and implementation	Facilitating by making sure organisations work together in an effective manner and share knowledge.	• In which way has the municipality shown support by connecting organisations and encourage knowledge sharing?
		Facilitating by expediting permits or approval for projects.	• In which way has the municipality shown support by expediting permits or approval for projects?
Municipal support rationale	Increasing effectiveness and integration	Expectation that bottom-up initiatives increase effectiveness and integration.	• To what extent does the municipality support bottom-up initiatives to increase effectiveness of policies?
	Access to shared resources	Join forces and have access to shared resources, such as knowledge, leadership and skills.	• To what extent does the municipality support bottom-up initiatives to have access to more resources?

	Alignment	Municipalities understanding what is going on in society.	• To what extent does the municipality support bottom-up initiatives to have a better understanding of social issues?
		Citizen get more aligned with municipal policies.	• To what extent does the municipality support bottom-up initiatives to get citizen aligned with their policies?

Appendix 2: Overview of approached cooperatives

Cooperative	**City**
Zuiderlicht	Amsterdam
Ecostroom	Amsterdam
Buurtcoöperatie Oostelijk Havengebied	Amsterdam
Duurzaam Soesterkwartier	Amersfoort
Best Duurzaam	Best
070 Energie	Den Haag
Amsterdam Energie	Amsterdam
Blijstroom	Rotterdam
Buurtstroom	Den Haag
Alkmaar Energie	Alkmaar
De Groene Regentes	Den Haag
Dezo	Zoetermeer
Energiek Schiedam	Schiedam
Solar Green Point	Den Haag
Nieuwe Lansinger Stroom	Berkel en Roderijs
Zon Op Zwijndrecht	Zwijndrecht
Volgelwijk Energie	Den Haag
Groenkracht Groenlo	Groenlo
Zutphen Energie	Zutphen
SpoorZon	Zeist
De Hoeven Energie	Houten
Eemstroom	Amsterfoort

De Ramplaan	Haarlem
MeerEnergie	Amsterdam
Zonnecoöperatie West-Friesland	(West-Friesland)
020 Energie Eindhoven	Eindhoven
Brede Duursaam	Breda
Groen Zonnig Woensel	Woensel
Deventer Energie	Deventer